Western Cape Government
Environmental Affairs and Development Planning

BETTER TOGETHER.

2ND GENERATION WESTERN CAPE INTEGRATED WASTE MANAGEMENT PLAN

DRAFT STATUS QUO REVIEW

DATE: MARCH 2016

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Annexure A First Generation Western Cape Integrated Waste Management Plan: Implementation Plan: Progress to date

Annexure B Summary of Public Participation Engagements Responses

Annexure C Draft Status Quo Review: Stakeholder Reply Sheet

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Acronymns

2W2W	2Wise2Waste
C&D	Construction and Demolition
CBO	Community-based organisation
CCT	City of Cape Town
CITP	Comprehensive Integrated Transport Plan
CKDM	Central Karoo District Municipality
COGTA	National Department of Cooperative Governance and Traditional Affairs
CSIR	Council for Scientific and Industrial Research
CWDM	Cape Winelands District Municipality
DEA	Department of Environmental Affairs
DEADP	Western Cape Department of Environmental Affairs and Development Planning
DM	District Municipality
DoLG	Department of Local Government
DoRA	Division of Revenue Act
DST	Department of Science and Technology
DTI	Department of Trade and Industry
e-Waste	Electronic Waste
EDM	Eden District Municipality
EIA	Environmental Impact Assessment
EPIP	Environmental Protection and Infrastructure Programme
EPR	Extended Producer Responsibility
eWASA	e-Waste Association of South Africa
GDP	Gross Domestic Product

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GDPR	Gross Domestic Product per Region
GESF	Green Economy Strategic Framework
GHS	Globally Harmonised System of Classification and Labelling of Chemicals
GPS	Growth Potential Study of Town
HIA	Heritage Impact Assessment
ICT	Information and Communications Technology
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IIWTMP	Integrated Industry Waste Tyre Management Plan
IPWIS	Integrated Pollutant and Waste Information System
IWMOF	Western Cape Integrated Waste Management Officer'sForum
IWMP	Integrated Waste Management Plan
LC	Leachable Concentration
LCT	Leachable Concentration Threshold
LG MTEC	Local Government Expenditure Committee
LM	Local Municipality
MEC	Member of Executive Council
MIG	Municipal Infrastructure Grant
MINMEC	Minister of Environmental Affairs and members of Provincial Executive Councils
MINTECH	Director-General of Environmental Affairs and heads of provincial departments
MIWMI	Municipal Integrated Waste Management Infrastructure
MRF	Materials Recovery Facility
MSA	Municipal Systems Act
MTSF	Medium Term Strategic Framework
NDP	National Development Plan

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NEMA	National Environmental Management Act, 107 of 1998
NEMWA	National Environmental Management: Waste Act, 59 of 2008
NGO	Non-governmental organisation
NWMS	National Waste Management Strategy
ODM	Overberg District Municipality
PETCO	Plastic Recycling South Africa
PSDF	Provincial Spatial Development Framework
PSP	Provincial Strategic Plan
RDI	Research, Development and Innovation
REDISA	Recycling and Economic Development Initiative of South Africa
RoD	Record of Decision
SAEWA	South African E-Waste Alliance
SALGA	South African Local Government Association
SANS	South African National Standards
SAWIS	South African Waste Information System
SDF	Spatial Development Framework
SoEOR	State of Environment Outlook Report
SOP	Standard Operation Procedure
SMME	Small, medium and micro enterprise businesses
Stats SA	Statistics South Africa
TC	Total Concentrations
WC IWMP	Western Cape Integrated Waste Management Plan
WCDM	West Coast District Municipality
WCG	Western Cape Government
WCIF	Western Cape Infrastructure Framework

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WCMR	Waste Classification and Management Regulations
WCRAG	Western Cape Recycling Action Group
WISP	Western Cape Industrial Symbiosis Programme
WMO	Waste Management Officer

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Glossary

Terms	Definition
Anthropogenic	Environmental pollution originating in human activity.
Buy back facility	Is the place that allows residents to sell recyclables.
Category A Municipality	Metropolitan municipalities.
Category B1 Municipality	Secondary cities: Drakenstein, George, Stellenbosch All local municipalities referred to as secondary cities.
Category B2 Municipality	Large towns: Knysna, Mossel Bay, Overstrand, Saldanha Bay, Breede Valley All local municipalities within an urban core. There is a huge variaition in population sizes amongst these municipalities and they do have large urban dwelling population.
Category B3 Municipality	Small towns: Beaufort West, Berg River, Bitou, Cape Agulhas, Cederberg, Hessequa, Kannaland, Laingsburg, Langeberg, Matzikama, Prince Albert, Swartland, Swellendam, Theewaterskloof, Witzenberg. Characterised by no large town as a core urban settlement. Typically have a relatively small population, mostly urban and based in few small towns. Rural areas are characterised by the presence of commercial farms.
Category B4 Municipality	Mostly rural Characterised by the presence of at most one or two small towns, communal land tenure and villages or scattered groups of dwellings; typically located in former homelands.
Category C Municipality	District Municipalites: Central Karoo District Municipality Cape Winelands District Municipality Eden District Municipality District Municipality Overberg District Municipality West Coast District Municipality
Cleaner Production	Means the continuous application of an integrated preventative environmental strategy applied to processes, products and services to increase eco-efficiency and reduce risks to humans and the environment.

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Decommission	In relation to waste treatment, waste transfer or waste disposal facilities, means the planning for and management, and remediation of the closure of a facility that is in operation or that no longer operates.
Decoupling	Refers as breaking the link between the environmental degradation and economic goods that can be done by less virgin material and promote the re-use, recycling of products by doing that you minimise the impact on the environment.
Disposal	Means the burial, deposit, discharge, abandoning, dumping, placing or release of any waste into or any land.
Driver	Drivers or pressures can be defined as broad categories of factors that influence waste management directly i.e. population growth; economic development; urbanisation; events and tourism.
Drop off facility	Is facilities that provides the residents the convenient opportunity to dispose waste, which they have not put out for collection, into containers for later removal by the municipality.
Enabler	Refers to capabilities, forces, and resources that contribute to the success of an entity, program or project.
Environmental governance	Refers to the processes of decision-making involved in the control and management of the environment and natural resources. It is also about the manner in which decisions are made (i.e. are they made behind closed doors or with input from the broader public). Principles such as inclusivity, representivity, accountability, efficiency and effectiveness, as well as social equity and justice, form the foundation of good governance.
Formal recycler	It refers to companies that process recyclable waste into a form that is readily usable by a manufacturer or end –use market, where the recyclable waste is converted into materials or other consumption products.
Free Basic Services	Free basic service is defined as the minimum amount of basic levels of services, provided on a day to day basis, sufficient to cover or cater for the basic needs of the poor households. Various sector departments have set minimum standards outlining basic amount of services or quantity to be supplied to the indigents with regards to water, energy, sanitation and refuse removal. Free basic refuse removal levels of services/standards include: (a) On-site appropriate and regularly supervised disposals; (b) Community transfer to central collection points; (c) Organised transfer to central collection points and/or kerbside collection (in high density settlements); or (d) A combination of methods above
Game changer	Refers to priority projects, called "Game Changers", because they have the potential to be catalysts for substantial improvements in people's lives. These are bold and focused interventions.

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General waste	Means waste that does not pose an immediate hazard or threat to health or to the environment, and includes: (a) domestic waste; (b) building and demolition waste; (c) business waste; (d) inert waste; or (e) any waste classified as non-hazardous waste in terms of the regulations made under section 69, and includes non-hazardous substances, materials or objects within the business, domestic, inert or building and demolition wastes.
Hazardous waste	Means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within the business waste, residue deposits and residue stockpiles.
Inclusive growth	Captures the importance of structural transformation for economic diversification, socio-economic and competition. It puts the emphasis on policies that remove constraints to growth and inequality and creates a level playing field for investment and access to opportunity. Inclusive growth refers both to the pace and pattern of growth, which are considered interlinked. The emphasis is thereby placed on the idea of equality in terms of access to opportunity, markets, resources, and an unbiased conducive regulatory environment for businesses and individuals. The focus is on creating work opportunities characterised by increased productive value and growing competitive businesses rather than increasing the quantum of jobs regardless of whether it was done in a sustainable and competitive manner.
Indigent	The term 'indigent' means 'lacking the necessities of life'. In a South African context, the Constitution provides a guide in this regard, leading to the view that the following goods and services are considered as necessities for an individual to survive: a) Sufficient water b) Basic sanitation c) Refuse removal in denser settlements d) Environmental health e) Basic energy f) Health care g) Housing h) Food and clothing Anyone who does not have access to these goods and services is considered indigent.
Informal reclaimers	Collection of recyclables from reclaimers on a regular basis and transport of recyclables to a reclaiming depot.
Integrated Waste Management	Means employing several waste control and disposal methods i.e. reduce, re-use, recycle, incineraton, and landfilling, to minimise the environmental impact of commercial and industrial waste streams.
Integrated Waste Management Plan	Means a plan prepared in terms of Section 12 of the Waste Act (59 of 2008).

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Landfill site (Waste disposal facility)	It is defined as a site for the controlled disposal of waste materials.
Material Recovery Facility	It is a center for the reception and transfer of materials recovered from the waste stream for recycling. Materials are sorted by type and treated.
Minimisation	Means the avoidance of the amount and toxicity of waste that is generated and in the event where the waste is generated, the reduction of the amount and toxicity of waste that is disposed.
Municipal Solid Waste	Waste generated from residential and non-industrial commercial sources. It includes predominantly household waste (domestic waste) with sometimes the addition of commercial waste collected by a municipality within a given area. It includes both solid or semi-solid wastes and generally excludes industrial hazardous waste.
Polluter Pays Principle	All costs associated with waste management should, where possible, be borne by the waste generator.
Product-Stewardship Principle	Means the producer or importer of a product should take all responsible steps to minimise environmental harm from production, use and disposal of the product.
Re-use	To utilise the whole, a portion of a specific part of any substance, material or object from the waste stream (again) for a similar or diffirent purpose without changing the form or properties of such substance, material or object.
Regional Gross Domestic Product (GDPR)	GDPR at market prices equals the sum of gross value added by all industries at basic prices plus taxes on products minus subsidies on products in a region.
Recovery	Means the controlled extraction of material or the retrieval of energy from waste to produce a product.
Sustainable Development	Reflects a process that meets the needs of the present without compromising the ability of future generations to meet their own needs. Often called intergenerational equality, the idea is that we should share natural resources not just with people who are alive on the planet today but also with future generations of the Earth's inhabitants. While we can use a certain amount of the planet's resources, we should never entirely deplete a natural resource. Sustainable development requires people to rely as much as possible on renewable resources (the kind that can be replenished) by getting power from the sun rather than power from fossil fuels such as oil, coal, and natural gas, which take millions of years to form. Besides the careful stewardship of natural resources, sustainable development promotes the eradication of poverty and extreme income and wealth inequalities, the goal of full employment, the provision of access to quality and affordable basic services to all South Africans, and the fostering of a stable, safe and just society.
Swop shop	It is an exchange of recyclable material for goods that are basic needs. The material is valued through a point system which can be redeemed for goods.

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Transfer Station	It is a facility that receives solid waste from collection vehicles and reloads that waste into larger vehicles for transfer to a disposal of processing facility
Treatment	Means any method, technique or process that is designed to (i) Change the physical, biological or chemical character or composition of a waste or (ii) Remove, separate, concentrate or recover a hazardous or toxic component of a waste (iii) Destroy or reduce the toxicity of waste, in order to minimise the impact of the waste on the environment prior to further use or disposal.
Urbanisation	Is the physical growth of urban areas which result in migration and even surburban concentration into cities.
User Pays Principle	Means all costs associated with the use of a resource should be included in the price of goods and services developed from that resource.
Waste	(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or (b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the *Gazette*, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste- (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered; (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered; (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.
Waste Management Facility	It is defined as a place, instrument, structure or contaminent of anykind, where a waste management activity take place and includes a waste transfer station, containeryard, landfill site, incinerator, lagoons, recycling and composting facilities.
Waste Treatment Facility	Means any site that is used to accumulate waste for the purpose of storage, recovery, treatment, reprocessing, recycling or sorting of the waste.

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Organisation of this Report

The structure of the report is as follows:

Chapters		Description
Chapter 1	**Introduction**	This section is an introduction to the development of the 2nd Generation Western Cape Integrated Waste Management Plan and emphasises the need for integrated waste management planning. It also provides the background, purpose, strategic alignment, scope, approach and methodology of this report.
Chapter 2	**Legislative, Policy & Institutional Framework**	Chapter 2 identifies legislation, policy and frameworks designed to facilitate and control waste management in South Africa and in the Western Cape province. It also identifies several changes to the Waste Regulations and Norms and Standards since the development of the 1st Generation Western Cape Integrated Waste Management Plan.
Chapter 3	**Links to other policy areas**	This is a synthesis of planning reports, relevant to waste management in the Western Cape, into a coherent base upon which to formulate the 2nd generation Western Cape Integrated Waste Management Plan.
Chapter 4	**Waste management in the Western Cape**	Chaper 4 outlines the existing waste management activities per district and metropolitan municipality in the province. This chapter also provides the participatory process conducted which is key for the successful implementation of an Integrated Waste Management Plan.

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1. CHAPTER 1: INTRODUCTION

1.1 Background

In terms of the National Environmental Management: Waste Act (Act No. 59 of 2008) (Waste Act), a provincial government is required to compile an Integrated Waste Management Plan (IWMP) and may incorporate the IWMP in any relevant provincial plan. A provincial department needs to report annually on the implementation of the plan.

The National Waste Management Strategy (2011) (NWMS) is a legislative requirement of the Waste Act with a purpose to achieve the objects of the Waste Act and seeks to systematically improve waste management in South Africa. South Africa is committed to sustainable development and aims to balance the broader economic and social challenges of a developing and unequal society while protecting the environmental resources with a need to eliminate the unnecessary use of raw materials, supporting sustainable product design, resource efficiency and waste prevention (NWMS 2011). Therefore the Waste Act promotes integrated waste management through the internationally accepted Waste Management Hierarchy (Figure 1) which deals with options for waste management during the lifecycle of waste. The hierarchical approach is at the centre of the NWMS and its main focus is on waste avoidance and minimisation through sustainable practices as well as ensuring the diversion of waste from waste disposal facilities. Material resource efficiency assists with the reduction of the amount of waste produced and if waste generation cannot be avoided, the waste generated needs to be reduced through the 3Rs of waste management (re-use, recycling, recovery).

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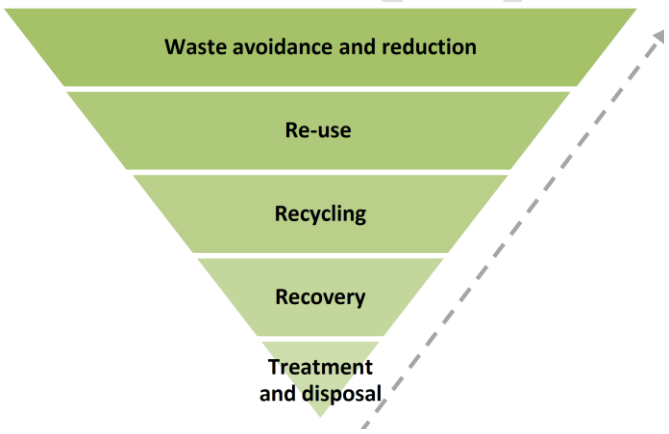

Figure 1: Waste Management Hierarchy (NWMS 2011)

The Waste Management Hierarchy is the primary building block of an integrated waste management framework for the safe removal, treatment and disposal of waste. It promotes a reduction in waste generation in absolute terms with the aim to decouple anthropogenic impact on the environment through the use of natural resources. This requires radical innovation to influence resource efficiency by moving away from the current unsustainable linear flow trajectory to non-linear systems (closed loop) leading to fewer waste outputs. This will ultimately create significant economic and social opportunities and a cleaner environment therefore achieving sustainable integrated waste management.

1.2 Purpose of the Report

In 2004, the Western Cape Government (WCG): Department of Environmental Affairs and Development Planning (hereinafter called "the Department") initiated the development of 1st generation IWMPs for municipalities in the Western Cape. By 2007 all 30 municipalities developed their 1st generation IWMPs. Subsequently, all the municipalities have developed their 2nd generation IWMPs between 2010 and 2015, with some having already commenced with the development of their 3rd generation IWMPs. The 2nd and 3rd generation IWMPs inform the status of waste management in the province.

In 2011, the Department developed its 1st generation provincial IWMP (WC IWMP) through a consultative process. The purpose of this report is to review and update the 1st generation WC IWMP in order to facilitate the implementation of the Waste Act and the NWMS and to improve waste management in the Western Cape by:

- Promoting sustainable waste management, this includes; waste avoidance, cleaner production, waste minimisation, resource-use efficiency, resource recovery and recycling;
- Diverting waste from waste management disposal facilities;
- Minimising adverse environmental and social impacts of waste management, particularly for the vulnerable; and
- Providing guidance and support for both municipalities and industries in developing IWMPs which promotes Integrated Waste Management.

This report provides strategic direction regarding integrated waste management over the short, medium and long term to provincial government, local government, industry, commerce and civil society.

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1.3 Strategic Alignment

Since the development of the 1st generation WC IWMP some of the short-term actions have been implemented (Annexure A). However, the policy context of waste management has changed in the past few years and alignment with the following National and Provincial Strategic Frameworks is needed:

1.3.1 National Development Plan 2030 (2012)

This plan maps out the vision of the country for the 15 years ahead with its key objective to reduce poverty and inequality in South Africa by 2030, creating jobs, adressing spatial transformation, the expansion of infrastructure and building environmental sustainability and resilience.

The National Development Plan (NDP) highlights increasing quantities of waste, poor waste management and lack of access to waste services lead to pollution, health risks and environmental degradation. Levels of recycling and re-use are low and waste is not valued as a resource with economic potential.

The NDP states that waste makes up 2% of emissions and a countrywide programme needs to be developed to capture methane emissions. South Africa needs to cut down on waste disposal, promote composting and recycling of organic waste. The NDPs vision for waste management is investment in consumer awareness, green product design, recycling infrastructure and waste-to-energy projects which would result in significant strides to becoming a zero-waste society. The emergence of small, medium and micro enterprises in waste management will contribute to reducing unemployment, poverty and income inequality. It aims to implement a waste management system through the rapid expansion of recycling infrastructure, and encouraging the composting of organic domestic waste to bolster economic activity in poor urban communities.

1.3.2 Medium Term Strategic Framework (2014 – 2019)

This framework is the national implementation framework for the NDP. Its aim is to "*Protect and enhance our environmental assests and natural resources*". It promotes the improved management of waste (including hazardous waste, healthcare waste, mine dumps, leachate/sludge and general/solid waste) and investment in recycling infrastructure and services.

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1.3.3 OneCape2040 (2013)

This plan compliments the NDP and envisages a transition towards a resilient, inclusive and competitive economy for the Western Cape region with higher rates of employment producing growing incomes, greater equality and an improved quality of life.

Various commitments from all spheres of government are required.

- Provincial and local government: to change policies to incentivise green living and make a commitment to the green growth path;
- National government: to ensure sustainable energy generation licencing and pricing including responsible water resource management including allocations and pricing.
- Private sector: invest in retro-fitting business to be sustainable and stop investing in unsustainable resource use activities
- Labour role: stop consumption behaviour
- Civil and communty role: change consumption patterns

1.3.4 Western Cape Government: Provincial Spatial Development Framework (2014)

This plan addresses the lingering spatial inequalities that persists as a result of the apartheid's legacy, unsustainable resource consumption and disposal. It identifies regional planning initiatives to address specific economic, social, natural or unique features in a specific area. Three urban and two rural priority areas have been identified. The feasibility into regionalisation of waste management services in the regional planning areas would need to be explored.

1.3.5 Western Cape Government: Western Cape Green Economy Strategy Framework (2013)

It is a framework for the Western Cape to become the lowest carbon province and leading green economic hub of the African continent. It aims to grow the commercial waste economy in partnership between public and private sectors as a major source of green jobs.

1.3.6 Western Cape Government: Provincial Strategic Plan (2014 – 2019)

This plan gives effect to the National Development Plan and Provincial Strategic Goals. Of relevance are Goals 1, 4 and 5: (1) create opportunities for growth and jobs (4) to enable a resilient, sustainable, quality and inclusive living environment, (5) embedding good governance and integrated service delivery through partnerships and spatial planning.

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1.3.7 Western Cape Government: Department of Environmental Affairs and Development Planning: Strategic Five Year Plan (2015 – 2020)

The Provincial Strategic Plan 2014 – 2019 and its strategic goals (above) are the key informants in the development of the Department's strategic goals and objectives. The Department's Strategic Plan aims to promote Goal 4 ***"a resilient, quality and inclusive living environment in support of human well-being".*** The strategic goals, in support of Goal 4, identified are improved climate change resilience and a lower carbon province; improved settlement functionality, efficiencies and resilience; maintenance and sustainable use of agricultural and ecological resources and infrastructure; efficient, effective and responsive governance and opportunities to establish the Green Economy and Biodiversity Economy. Waste management has a direct bearing on Goal 4 as it impacts on a city's attractiveness (i.e. efficient collection, disposal), and social and economic development.

The 2nd generation WC IWMP takes cognisance of the above-mentioned strategic frameworks as it directly relates to integrated waste management planning and therefore are considered in this report.

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1.4Scope of the Report

This report covers the geographical area of the Western Cape province of South Africa, which makes up 10.6% of the country's land surface and covers an area of approximately 129 462km^2. It is the 4th largest province in South Africa and is divided into one metropolitan municipality and five district municipalities which are further subdivided into twenty four local municipalities (Figure 2).

Figure 2: Geographical area of the Western Cape province

The municipalities in the Western Cape indicated per district municipality where applicable:

Cape Winelands District:	Breede Valley (B2) Drakenstein (B1), Langeberg (B3), Stellenbosch (B1) and Witzenberg (B3).
Eden District:	Bitou (B3), George (B1), Hessequa (B3), Kannaland (B3), Knysna (B2), Mossel Bay (B2) and Oudtshoorn (B2)
West Coast District:	Bergrivier (B3), Cederberg (B3), Matzikama (B3), Saldanha Bay (B2) and Swartland (B3).
Central Karoo District:	Beaufort West (B3), Laingsburg (B3) and Prince Albert (B3).
Overberg District:	Cape Agulhas (B3), Overstrand (B2), Swellendam (B3) and Theewaterskloof B3).[1]
City of Cape Town Metropolitan	

[1] B1 local municipalities consists of secondary cities; B2 of large towns and B3 consists of small towns.

1.5 Approach and Methodology

The approach to the review of the WC IWMP includes:

- Regulatory framework of waste management in South Africa; and
- National and Provincial Frameworks and Strategies, District and Local Municipal IWMPs, documents and studies that informs and have strong links and impacts on waste management in the province.

The above literature will inform the Department's outlook towards Sustainable Integrated Waste Management in the Western Cape province.

The development of the WC IWMP consists of two phases and is as follows:

Table 1: 2nd Generation WC IWMP: Review Process

Phase 1	Phase 2
Actitivites & Outputs: 2015/2016 financial year	**Actitivites & Outputs: 2016/2017 financial year**
• **Chapter 1** – Introduction • **Chapter 2** – Legislative, Policy & Institutional Framework • **Chapter 3** – Links to other policy areas • **Chapter 4** –Waste management in the Western Cape **Output:** Status Quo Report	• **Chapter 5** –Gaps & Needs Analysis • **Chapter 6** – Strategic Objectives & Instruments for Implementing the WC IWMP • **Chaper 7** - Implementation, Monitoring & Review • **Chapter 8**– Conclusion **Output:** Second generation WC IWMP

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The strategic goals of this report is two-fold: Firstly, Phase 1 focuses on the status quo of waste management in the Western Cape province and is referred to as the "2nd Generation Western Cape Integrated Waste Management Plan: Status Quo Report". Secondly, Phase 2 identifies waste management needs and objectives, and develops an implementation strategy for review and monitoring of implementation. Phase 2 completes the development of the "2nd Generation Western Cape Integrated Waste Management Plan".

A consultative process, throughout the development of the report, includes public participation and consultation. This process is a key component for the successful completion of this plan. It aims to identify issues, concerns and queries related to waste management in the Western Cape province.

1.5.1 Public Participation and Stakeholder Engagement

The public participation process consists of three phases.

- Phase 1: Status Quo Report
  - Background Information (November & December 2015)
  - Status Quo of Waste Management in the Western Cape (March 2016)
- Phase 2: Gap and Needs Analysis (July 2016)
- Phase 3: Project Implementation (November 2016)

The public participation process to date is described below.

Phase 1: Status Quo Report: During November and December of 2015 public participation engagements were held with key stakeholders (businesses, industries, municipalities, non-governmental organisations and private sector), within the five districts and the City of Cape Town to obtain information regarding the status of waste management in the Western Cape. The engagements were conducted as shown below:

District/Metropolitan Municipality	Date
Eden District (George)	17 November 2015
Overberg District (Hermanus)	18 November 2015
Central Karoo District (Beaufort West)	24 November 2015
West Coast District (Langebaan)	25 November 2015
Cape Winelands (Worcester)	1 December 2015
City of Cape Town (Kraaifontein)	2 December 2015

A summary of outcomes of the Phase 1 public participation engagements (November & December 2015) is attached as Annexure B.

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1.6 Summary of Chapter 1

This Chapter gave background to the need to develop, review and align IWMPs with relevant legislation and strategic frameworks. It explained that an integrated waste management system can only be realised by promoting sustainable and integrated waste management through the internationally accepted Waste Management Hierarchy. The approach to the development of the IWMP is two-fold and is developed over two financial years.

The next Chapter explains the legislative, policy and institutional framework pertaining to waste management at a national, provincial and local level as well as changes to the waste legislation since the development of the 1st generation WC IWMP.

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2. CHAPTER 2: LEGISLATIVE, POLICY & INSTITUTIONAL FRAMEWORK

2.1 Introduction

This Chapter gives an overview of legislation and policies designed to facilitate and control pollution and waste by improving waste management in South Africa and in the Western Cape province. This Chapter discusses national, provincial and local level governance in the waste sector and ends with changes to the waste legislation since the development of the 1st generation WC IWMP.

2.2 Waste Legislation

The most pertinent and important legislative requirements in terms of waste management are contained in a number of statutes and national policies, including but not limited to:

- Constitution of the Republic of South Africa, No. 108 of 1996
- Environment Conservation Act, No. 73 of 1989
- National Environment Management Act, 107 of 1998
- National Environment Management: Air Quality Act, No. 39 of 2004
- National Environment Management: Waste Act, No. 59 of 2008
- National Waste Management Strategy, 2011

The above list and other significant legislation are outlined below.

2.2.1 Constitution of the Republic of South Africa, No. 108 of 1996

The Constitution is the supreme law of South Africa and provides the foundation for environmental regulations and policy. Section 24 in Chapter 2 of the Bill of Rights states that everyone has a right to an environment that is not harmful to their health or well-being and to have the environment protected to benefit the present and future generations. This imposes a duty on all organs of state to promulgate legislation to implement policies that ensure that this right is upheld.

Chapter 7 of the Constitution describes specific roles of local government. These are:

- To ensure service delivery to communities in a sustainable manner; and
- To promote a safe and healthy environment.

Schedules 4 and 5 of the Constitution require local government to provide cleansing services, pollution control, refuse removal and to manage solid waste disposal facilities. Provincial government has the responsibility to ensure that municipalities perform these roles.

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2.2.2 Constitution of the Western Cape, Act 1 of 1998

The Constitution of the Western Cape corresponds with and recognises the National Constitution as the supreme law of the Republic of South Africa. Chapter 10 of the Provincial Constitution provides the directive principles of the provincial policy and is aimed at achieving the following:

- Section 81(m) The protection of the environment in the Western Cape, including its unique fauna and flora, for the benefit of present and future generations; and
- Section 81(n) The protection and conservation of the natural historical, cultural historical, archaeological and architectural heritage of the Western Cape for the benefit of the present and future generations.

The directive principles and provincial policy, listed above, guides the Western Cape government in making and applying laws.

2.2.3 Municipal Structures Act, No. 117 of 1998

This Act provides for the establishment of municipalities in accordance with the requirements relating to categories and types of municipality. It establishes criteria for determining the category of municipality to be established in an area and defines the types of municipality that may be established within each category. Chapter 5 of the Act furthermore provides for the division of functions and powers between district and local municipalities and regulates the internal systems, structures and office-bearers of the municipalities. The Act also provides for appropriate electoral systems for matters in connection therewith.

2.2.4 Municipal Systems Act, No. 32 of 2000

This Act provides for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities. It ensures the access to essential services that are affordable to all and defines the legal nature of a municipality including the community within the municipal area and clarifies the executive and legislative powers of municipalities. The Act requires local municipalities to put in place tariffs and credit control policies to take into account the needs of the poor. The Act also promotes the participation of local communities in local governance.

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2.2.5 National Environmental Management Act, No. 107 of 1998

This Act provides the legislative framework for environmental management and contains environmental management principles that ensure that the environment is protected from degradation by taking a preventive approach before it takes place or a precautionary approach when scientific knowledge is lacking and holding any person who causes environmental degradation responsible for the damage.

It places sustainable development at the heart of every development process that has the potential to have an impact on social, economic and environment. It requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions in order to ensure development serves the present and future generations.

2.2.6 National Environment Management: Waste Act, No. 59 of 2008

The Waste Act provides the basis for the regulation of waste management in South Africa. It adopts the waste management hierarchy as a national approach to waste management to ensure the protection of human health and the environment by providing measures for the remediation of contaminated land. It also extends the mandate of municipalities to also incorporate waste minimisation within exsiting waste management functions.

2.2.7 National Environmental Management : Waste Amendment Act, No. 26 of 2014

The definition of waste was amended primarily by removing the definition of a by-product, including a provision stating that once a waste has been re-used, recycled or recovered it ceases to be waste, and providing the Minister with the power to exclude any waste, portion of waste or waste stream from the definition of waste. In addition, amendments in terms of a waste management pricing strategy for waste management charges and industry waste management plans are key issues that have been addressed. The amendments also relate to the functions of government and the establishment of the Waste Management Bureau and its policies, powers, objects, functions, funding, financial management, reporting and auditing, functions of the chief executive officer, employees and regulations, amongst others. Furthermore, the amendments include a section entitled "Schedule 3: Defined Wastes", which defines both hazardous and general waste types in Categories A and B, respectively.

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2.2.8 National Waste Management Strategy, 2011

The National Waste Management Strategy is a legislative requirement of the Waste Act and is structured around a framework of 8 goals which are to be met by 2016:

- Goal 1: Promote waste minimisation, reuse, recycling and recovery of waste;
- Goal 2: Ensure the effective and efficient delivery of waste services;
- Goal 3: Grow the contribution of the waste sector to the green economy;
- Goal 4: Ensure that people are aware of the impact of waste on their health, well being and the environment;
- Goal 5: Achieve integrated waste management planning;
- Goal 6: Ensure sound budgeting and financial management for waste services;
- Goal 7: Provide measures to remediate contaminated land; and
- Goal 8: Establish effective compliance with and enforcement of the Waste Act.

Municipalities are required to align their IWMPs to the above goals in order to contribute to the attainment of the goals by 2016. The NWMS relies on participation by various role-players such as the civil society, public and private sectors and to implement the Waste Act.

2.2.9 White Paper on Integrated Pollution and Waste Management for South Africa, Government Gazette, No. 20978, March 2000

The White Paper promotes a holistic and integrated approach on the importance of pollution and waste prevention. It is driven by a vision of environmentally sustainable economic development and the waste management hierarchy practices of source separation, reuse, recycling and safe disposal as a last resort.

It underpins international trends for efficient and effective management of resources and new approaches to prevention such as preventing pollution and waste and avoiding environental degradation rather than the so called "end-of-pipe" solutions.

2.2.10 Hazardous Substances Act, No. 5 of 1973

This Act provides for the control and management of substances which may be hazardous to human health.

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2.2.11 National Health Act, No. 61 of 2003

Section 32 of the Health Act states that metropolitan and district municipalities must ensure that appropriate municipal health services are effectively and equitably provided in their areas of jurisdiction. National government and provincial government must enter into an agreement and assign to a municipality, as contemplated in section 156 (4) of the Constitution, the following matters:

- Services to be rendered by the local municipality;
- Resources that the relevant member of the Executive Council must make available;
- Performance standards which must be used to monitor services rendered by the municipality; and
- Conditions under which the agreement may be terminated.

2.2.12 Heath Care Waste Management Amendment Act, No. 6 of 2010

The National Department of Environmental Affairs published the NEM:WA (Act No. 59 of 2008), which necessitated minor amendments to the Western Cape Health Care Waste Management Act in respect of the terminology used and to prevent any conflict or confusion.

2.2.13 Western Cape Health Care Waste Management Act, No. 7 of 2007

The Health Care Waste Management Act provides provides for the effective management (handling, storage, collection, transportation, treatment and disposal) of health care waste in order to protect communities and the environment from the risks posed by this waste as required in terms of section 24 of the Constitution.

2.2.14 Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007): Western Cape Health Care Risk Waste Management Regulations, 2013

The Regulations were developed to provide for the establishment of a health care waste manifest system that will ensure the effective management of health care waste by tracking all Health Care Risk Waste (HCRW) from "cradle to grave" in order to prevent illegal dumping incidents.

2.2.15 Environment Conservation Act, No. 73 of 1989

The purpose of this Act is to provide for the protection of the natural environment, the control of environmental pollution by prohibiting littering and controling the removal of littering, and controlling waste management. The Act also provides for the control of activities which may have a detrimental effect of the environment.

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2.2.16 National Water Act, No. 36 of 1998

This Act provides for the protection of water resources, which must be used equitably, and conserved in consideration of the protection of aquatic ecosystems; to meet basic human needs and to ensure the reduction and prevention of pollution and degradation of water resources.

2.2.17 National Environment Management: Air Quality Act, No. 39 of 2004

The objective of this Act is to protect the environment by providing reasonable measures that prevent air pollution and ecological degradation, promote conservation and secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

This Act gives effect to section 24(b) of the Constitution which states that everyone has a right to an environment that is not harmful to their health and well-being, and to have the environment protected, for the benefit of present and future generations.

2.2.18 National Domestic Waste Collection Standards (GG No. 33935 GN. No. 21)

Historically there were no standards for the collection of waste and basic refuse removal, including indigent households. The Standards came into effect on 21 January 2011 and aim to redress the past imbalances in waste collection services. Through these minimum standards, municipalities are required to meet waste services in urban, peri-urban and rural areas. Municipalities will use the standards to determine the level of service (on-site disposal, central collection points, kerbside collection or a mixture of the latter 2) to provide and to select the best options for waste collection, separation at source, provision of receptacles, collection vehicles, and health and safety standards.

2.2.19 Waste Classification and Management Regulations (GG No. 36784 GN. No. 634)

The Waste Classification and Management Regulations (WCMR) came into effect on 23 August 2013. Section 4 (2) of the WCMR specifies that all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234:2008 (Globally Harmonized System of Classification and Labelling of Chemicals (GHS)). The GHS classifies waste in terms of their physical and health hazards as well as the hazards they present to the aquatic environment. The WCMR refers all waste generators to SANS 10234:2008 where they must ensure that the waste they generate is classified in accordance with SANS 10234:2008 within one hundred and eighty (180) days of generation. Waste that was previously classified in terms of the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste (1998) must now be classified in terms of SANS 10234:2008. Waste listed in Annexure 1 of the WCMR does not require classification in terms of SANS 10234:2008. The preclassified list is included in Table 2.

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Table 2: General and hazardous waste preclassified list (Source: SANS 10234:2008)

General waste	Hazardous waste
Domestic waste	Asbestos waste
Business waste not containing hazardous waste or chemicals	Polychlorinated Biphenyls (PCB) waste or PCB containing waste
Uncontaminated building & demolition waste	Expired, spoilt or unusable hazardous products
Waste tyres	General waste (excl. domestic waste) which contains hazardous waste or hazardous chemicals
Garden waste	Mixed hazardous chemical waste from analytical or academic labs in containers <100 litres
Post consumer packaging	Health care risk waste
Non-infectious animal carcasses	
Uncontaminated, excavated earth	

2.2.20 National Norms and Standards for the Assessment of Waste for Landfill Disposal (GG No. 36784 GN. No. 635)

These Norms and Standards were promulgated on 23 August 2013 and prescribe the requirements for the assessment of waste prior to disposal to landfill, as required by regulation 8(1)(b) and (c) of the Waste Classification and Management Regulations of 2013. In this regard, the following information is required, and includes the identification of chemical substances present in the waste, the determination of total concentrations (TC) and leachable concentrations (LC) of elements and chemical substances identified in section 6 of these Norms and Standards, and to analyse the TC and LC of elements and chemcial substances in waste within 3 years of the aforementioned regulations. The TC and LC limits must also be compared to the threshold limits for total concentrations (Total Concentration Threshold (TCT) limits) and leachable concentrations (Leachable Concentration Threshold (LCT) limits). Based on the TC and LC limits exceeding the corresponding TCT and LCT limits respectively, the specific type of waste for disposal to landfill is then determined in terms of section 7 of these Norms and Standards, and classified as Type 0 to Type 4 Waste. The manner in which Type 0 - 4 waste are handled is addressed in the National Norms and Standards for Disposal of Waste to Landfill (GG No. 36784 GN No. 636).

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2.2.21 National Norms and Standards for Disposal of Waste to Landfill (GG No. 36784 GN. No. 636)

The National Norms and Standards for Disposal of Waste to Landfill were promulgated on 23 August 2013 and prescribe the requirements for the disposal of waste to landfill as required by regulation 8(1)(b) and (c) of the Waste Classification and Management Regulations of 2013. In particular, these Norms and Standards provide the minimum engineering design requirements for landfill containment barriers for Class A (hazardous waste) to Class D (inert waste) landfills, which are relevant for new landfills and new working cells at existing landfills. These Norms and Standards also provide the waste acceptance criteria for disposal to landfill, descibes the landfill disposal requirements for Type 0 to Type 4 Waste, and sets out waste disposal restrictions and the timeframe within which compliance must be achieved. The latter includes asbestos waste, expired/spoilt/unusable hazardous products, polychlorinated biphenyl (PCBs) (or PCB containing waste), and general waste (excluding domestic waste) which contains hazardous waste/chemicals, which may only be disposed of at hazardous waste facilities.

2.2.22 List of Waste Management Activities (GG No. 37083 GN. No. 921)

These regulations provide a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. These activities are set out in three categories, namely Category A, B and C. For Category A activities, a basic assessment process, as set out in the Environmental Impact Assessment Regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) must be undertaken as part of a waste management licence application, which a scoping and environmental impacts process is required for Category B activities. However, a person who wishes to commence with a waste activity under Category C is not required to undertake a waste management licence, but must comply with the relevant norms and standards of 2013. These include the Norms and Standards for the Storage of Waste, Standards for Extraction, Flaring or Recovery of Landfill Gas, and the Standards for Scrappiong or Recovery of Motor Vehicles.

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2.2.23 National Waste Information Regulations (GG No. 35583 GN. No. 625)

The DEADP developed the Integrated Pollutant and Waste Information System (IPWIS) and thus gives effect to section 60, 61 and 62 of the National Environmental Management Waste Act 59 of 2008 and require all holders of waste, including industries in the private sector, to report on their waste management practices. The Act defines a "holder of waste" to mean any one person who imports, generates, stores, accumulates, transports, processes, treats, or exports waste or disposes of waste and "industry" includes commercial activities, commercial agricultural activities, mining activities and the operation of power stations.

Waste planning requires accurate information on waste quantities disposed at and diverted from waste disposal facilities. Comprehensive information on waste flows from each waste management facility will be reported to the National South African Waste Information System (SAWIS), via IPWIS, which will contribute to an accurate national waste balance. The National Waste Information Regulations regulate the reporting of waste information for the protection of the environment and the management of waste. By 2016, all specified waste management facilities that are required to collect and report to the SAWIS are to have waste quantification systems (NWMS 2011).

2.2.24 Integrated Pollutant and Waste Information System

According to the Waste Act, the MEC may establish a provincial waste information system, which must include the information required by the national waste information system. Stakeholders that report to the provincial waste information system do not have to report to the national waste information system in which case the provincial departments will provide the information to the national department. A provincial waste information system, namely the Integrated Pollutant and Waste Information System (IPWIS), was established and export waste data to the South African Waste Information System (SAWIS). Section 63 states that the MEC may, by notice in the Gazette or in writing, require any person or organ of state to provide, within a reasonable time or on a regular basis, any data, information, documents, samples or materials to the MEC that are reasonably required for the purposes of a provincial waste information system established in terms of Section 62 or the management of waste in the province. The information contained in IPWIS must be made available to the public subject to the Promotion of Access to Information Act. 2000 (Act No. 2 of 2000).

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2.3 Industry Waste Management Planning

2.3.1 Integrated Tyre Waste Management Plan (GG No. 35927)

In order to deal with this priority waste stream the Department: Environmental Affairs approved the Recycling and Economic Development Initiative of South Africa (REDISA) Integrated Industry Waste Tyre Management Plan (IIWTMP), which was published in the Government Gazette [No. 35927] in November 2012. The plan aims to apply a unique methodology to waste management. The plan promotes tyre recycling and provides support by providing the collection and depot infrastructure required to collect waste tyres from across the country and deliver them to approved recyclers. This is funded by a waste management fee of R2.30 + VAT on every kilogram of new tyre rubber produced which is paid by tyre producers, both manufacturers and importers.

2.3.2 Plastic Carrier Bag and Plastic Flat Bag Regulations (GG No. 24831 GN. No. 625)

The plastic bag regulations were promlugated in May 2003 to address concerns around the growing volume of solid waste and associated pollution from disposable polyethelene shopping bags, as well as the lack of recyclability thereof. The regulations include a number of measures including a miminum thicknesses for plastic bags, the permissable printable area and ink type, imposing a levy on plastic bags, and preventing the importation of plastic bags. These meausures are intended to encourage the re-use and recycling of plastic bags, promote a market for recycled material, create employment in the waste sector, and to reduce pollution.

2.3.3 National Environment Management: Waste Act, No. 59 of 2008: Waste Management Plans for Approval (GG No. 39018 GN. No. 736)

This is a notice of intention (dated 24 July 2015) in terms of section 28(1) read with section 28(5) of the Waste Act, to require the Paper and Packaging Industry, Electrical and Electronic Equipment Industy and Lighting Industry to prepare and submit their Industry Waste Management Plans for approval.

2.3.4 National Environment Management: Waste Act, No. 59 of 2008: Industry Waste Management Plans (P.N. 365/2013)

This is a provincial notice (dated 22 November 2013) requesting each manufacturing company in the Paint, Ink, Adhesive, Cosmetic, Pharmaceutical and Cleaning Chemicals subsectors of the Consumer Formulated Chemical Sector in the Western Cape who generate on average more than 20kg of hazardous waste per day, to prepare and submit an Industry Waste Management Plan for approval.

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2.4 International Conventions

South Africa has international obligations in terms of hazardous substances and waste and is signatory to the Basel, Rotterdam and Stockholm Conventions and the Montreal Protocol.

- The Basel Convention addresses the need to control the transboundary movement of hazardous waste and their disposal. It sets out the categorisation of hazarouds waste and the policies between member countries.
- The BAN Amendment to the Basel Convention on the Control of transboundary movements of hazardous wastes and their disposal prohibits the export of hazardous waste from a list of developed countries to developing countries.
- The Rotterdam Convention promotes shared responsibilities and enforces transparency in relation to importation of hazardous chemicals.
- The Stockholm Convention aims to eliminate or restrict the production and use of persistent organic pollutants.
- The Montreal Protocol phases out the production of numerous substances that are responsible for ozone depletion.

South Africa must give effect to the provisions of the international waste related conventions.

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2.5 Overview of changes to Waste Legislation since 2010

At the time when the 2010 Status Quo of the 1st generation WC IWMP was drafted, the legislative and policy review made reference to the draft NWMS. The NWMS was since finalised and provides numerous waste management targets for 2016. The NWMS needs to be updated as waste management targets would need to be set beyond 2016. This is relevant as provinces and municipalities are required to align their goals and targets to that of the NWMS.

On 23 August 2013, the Waste Classification and Management Regulations (GN No. R. 634) were published in terms of section 69(1) of the NEMWA. These regulations present a significant shift in the former waste classification system and the associated management regime, under which wastes were classified and regulated in terms of minimum requirements for handling, classification and disposal of waste. Shortcomings in the previous Minimum Requirements resulted in the disposal of waste to landfill being the major waste management option used by waste generators (DEA, undated). The regulations on Waste Classification and Management aim to provide mechanisms which could implement the waste hierarchy and control the classification and management of waste in line with the provisions of the Waste Act, which emphasises the movement away from landfill disposal to treatment, reuse and recovery. The regulations require that waste generators classify waste according to SANS 10234 and that their waste be reclassified every five years. The regulations also aim to enhance accurate reporting on waste generation and management and facilitate the consideration of higher order waste management options as per the waste management hierarchy (DEA, undated).

Also published on the 23 August 2013, were the National Norms and Standards for the Assessment of Waste for Landfill Disposal (GN No. 635) and the National Norms and Standards for Disposal of Waste to Landfill (GN No. 636). The purpose of the Norms and Standards for the Assessment of Waste for Landfill Disposal is to prescribe the requirements for the assessment of waste prior to disposal to a landfill. The assessment of waste is aimed at determining whether disposal of certain waste is possible and if so to which type of landfill it should be disposed of at. The Norms and Standards for Disposal of Waste to Landfill set out the requirements for the disposal of waste to landfill, stipulate the waste acceptance criteria for disposal to landfill and provide waste disposal restrictions.

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Since 2010, amendments have also been made to the legislation pertaining to waste management licensing. The list of activities that have, or are likely to have a detrimental effect on the environment was amended in November 2013 (GN No. R. 921). The amended list is expected to have a positive impact by encouraging small-scale recyclers and treaters of waste to do business. This is as a result of the inclusion of higher thresholds that trigger a waste management licence e.g. larger thresholds for recovery/recycling of waste and the treatment of hazardous waste have been provided. Consequently, only large-scale recycling and waste treatment facilities would require a waste management license. The amended list of activities also introduced an additional category (Category C), for which a waste management license is not required but for which several Norms and Standards must be adhered to.

The recent changes to the legislation aim to ensure more sustainable practices within the waste sector by inter alia addressing implementation challenges of existing waste legislation, redressing past imbalances with respect to waste collection services and developing norms and standards that focus on recovery and recycling of waste rather than disposal. This is a response to the aspirations contained in the NDP of job creation and to provide a quality life for all. The DEA has embarked on law reforms to accelerate economic growth in the waste sector focusing in waste collection and recycling. The National Environmental Management Waste Amendment Act, 2014 (Act No. 26 of 2014) provides for the establishment of a Pricing Strategy for Waste Management Charges as well as the institutional mechanisms in a form of the Waste Management Bureau, which will fast track the implementation of the recycling economy in South Africa.

With the law reform and aspirations of the NDP, informed decision-making and governance, information management systems for environmental sustainability, in particular, are still inadequate. Although South Africa's environmental governance regime is considered to be world class, capacity constraints at different levels and especially in the areas of compliance monitoring and enforcement underpin many of the problems experienced. National government is committed to address inadequately informed decision-making through harnessing research and information management capacity to identify, develop and maintain datasets to generate policy-relevant statistics, indicators and indices in collaboration with other key contributors outside the sector.

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2.6 Institutional Framework

Figure 3 depicts the designated authorities at national, provincial and local level in the waste sector. It also shows the various structures and functions at all spheres of government.

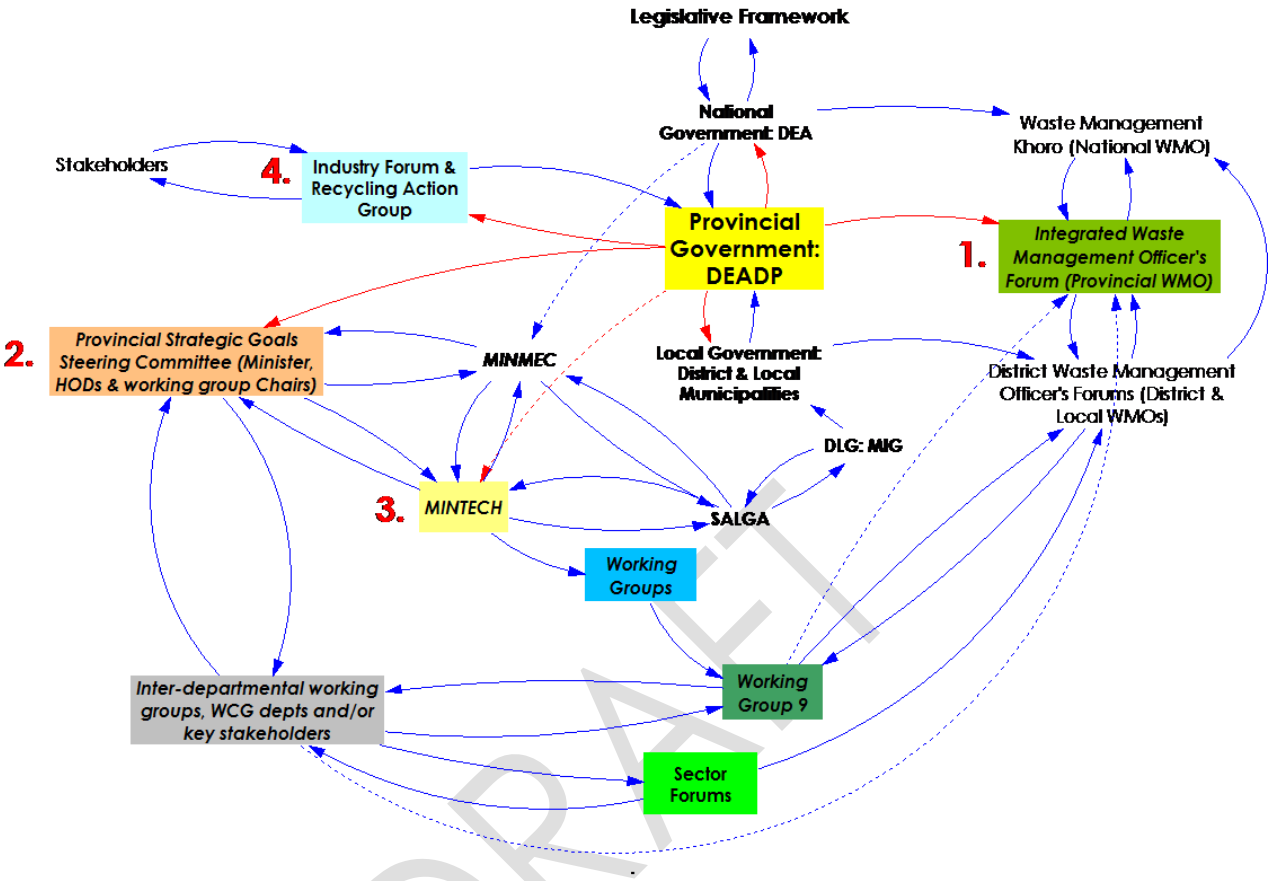

Figure 3: Institutional Framework: Waste Sector

Chapter 3 of the Constitution highlights co-operative governanace where the different spheres of government, although distinct, must work together in an interdependent and interrelated manner. Schedule 4 of the Constitution lists the areas where national and provincial government share concurrent national and provincial legislative competence. The environment is one of the concurrent competences of both national and provincial governance. The provincial powers of "*supervision*", "*monitoring*" and "*support*" of local government is derived from Section 41, 139 and 154 of the Constitution.

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The Waste Act requires the national department, provincial department and municipalities to designate Waste Management Officers (WMOs). The WMOs will be responsible for coordinating matters pertaining to waste management. In order to facilitate effective communication between WMOs, Integrated Waste Management Officer's Forums were established at various levels of government i.e. Waste Management Khoro (national government); Western Cape Integrated Waste Management Officer's Forums (provincial government) (Variable 1) and District Waste Management Officer's Forums (local government). The Central Karoo District Municipality does not have a Waste Management Officer's Forum but has established an environmental forum which deals with broader issues relating to environmental matters including waste.

The Western Cape Government also has a Provincial Transversal Management System, with steering committees and working groups covering the five Strategic Goals of the Western Cape Government (Variable 2). The steering committees and working groups are transversal in nature in that they are attended by Ministers, Heads of Departments and senior managers across government departments. The provincial working groups and steering commitees, together with the WMOs forums provide input to and receive information from National MINMEC, MINTECH (Variable 3) and Working Group 9.

Other important DEADP forums, which provide a platform for industry, are the Industry Forum and the Recycling Action Group (Variable 4).

Important forums particularly pertaining to municipalities include the SALGA Municipal Infrastructure Forum and the Department of Local Government Municipal Infrastructure Grant forum. Other important government departments, municipal representatives, NGOs and Industry bodies are also invited as stakeholders to attend and participate at these various governance platforms.

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2.6.1 Western Cape Government & DEADP

The Western Cape Government (WCG) sets the goal of ***"creating a resilient, inclusive and competitive Western Cape with higher rates of employment producing growing incomes, greater opportunity and an improved quality of life"***. Its vision is to build a province within which every citizen can access the socio-economic opportunities needed to improve their lives and to foster an opportunity society for all.

2.6.1.1 The Vision, Mission and Values of DEADP are as follows:

Vision: A resilient, sustainable, quality and inclusive living environment.

Mission: To promote a resilient, sustainable, quality and inclusive environment in support of human well-being.

Values: The Department endorses the values of the WCG, and commits itself to delivering services according to the following values:

- *Innovation*: *To be open to new ideas and develop creative solutions to problems in a resourceful way.*
- *Caring:* *To care for those we serve and work with.*
- *Competence:* *The ability and capacity to do the job appointed to do.*
- *Accountability:* *We take responsibility.*
- *Integrity:* *To be honest and do the right thing.*
- *Responsiveness:* *To serve the needs of our citizens and employees.*

The Department's mandate is underpinned by the National and Provincial Constitution and relevant legislation and policies which are applicable to the National and Provincial Government. The Department's activities are directly linked to the National Development Plan's (NDP) vision of an ***environmentally sustainable, climate change resilient and low carbon economy***. This is to be achieved by addressing ***urban and rural transformation***, ***improving infrastructure and building environmental sustainability and resilience***.

As per Sections 41, 139 and 154 of the Constitution, The Department has the powers of **"supervision"**, **"monitoring"** and **"support"** of local government. The Department also has certain functional mandates that it jointly shares with local government as well as certain exclusive mandates that affects local government. The Department has direct responsibility and a mandate for planning which falls within regional planning (Schedule 4) and development and provincial planning (Schedule 5).

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2.6.1.2 *Strategic Goals and Objectives*

The Provincial Strategic Goals (2014 – 2019) are key informants in the development of the Department's Strategic Goals and Strategic Objecitves.

STRATEGIC GOAL 1:
Create opportunities for growth and jobs
STRATEGIC GOAL 2:
Improve education outcomes and opportunities for youth development
STRATEGIC GOAL 3:
Increase wellness, safety and tackle social ills
STRATEGIC GOAL 4:
Enable a resilient, sustainable, quality and inclusive living environment
STRATEGIC GOAL 5: Embed good governance and integrated service delivery through partnerships and spatial alignment

Figure 4: Provincial Strategic Goals (2014 – 2019)[2]

Waste management has direct links with Strategic Goal 1, 4 and 5 and to some extent with goals 2 and 3. These are discussed in Table 3 below.

[2] Western Cape Government: Provincial Strategic Plan (2015)

During 2014, the Department held various strategic planning sessions and has developed strategic goals and objectives which support the provincial strategic goals. Table 3 depicts the alignment of the provincial strategic goals and the Departments' strategic goals and objectives.

Table 3: Western Cape Strategic Goals & Objectives[3]

Provincial Strategic Goals	DEADP Strategic Goals	DEADP Strategic Objectives
1. Creating opportunities for growth and jobs.	Increased economic opportunity through low-carbon development, the biodiversity economy and resource efficiency economy.	Opportunity for the green economy and biodiversity economy established.
2. Improve education outcomes and opportunities for youth development		
3. Increase wellness, safety and tackle social ills		
4. Enable resilient, sustainable, qualityand inclusive living environment	Sustaining the ecological and agricultural resource-bases. Sustainable and integrated urban rural settlements	***Maintenance and sustainable use of agricultural and ecological resources and infrastructure.*** Improved settlement functionality, efficiencies and resilience. Improved climate change resilience and lower carbon Province
5. Embed good governance and integrated service delivery through partnerships and spatial alignment	Good governance and integrated management	Efficent, effective and responsive governance

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The primary objectives of the strategic priorities are to create conditions for economic growth, provide better education and achieve better health, safety and social outcomes. Waste management has direct links with the above strategies and goals as it impacts on a city's attractiveness and its social, political and economic development.

[3]Western Cape Government: Environmental Affairs and Development Planning: Strategic Five Year Plan (2015)

2.6.2 District & Local Governance

The Municipal Structures Act (1998) sets out the division of functions and powers between a district and local municipality. Local municipalites are responsible for refuse removal, refuse dumps and solid waste disposal whereas district municipalites are responsible for solid waste disposal sites serving the area of the district municipality as a whole. District municipalities must:

- Ensure integrated development planning for the district as a whole;
- Promote bulk infrastructure development and services for the district as a whole;
- Build capacity of local municipalities in its area to perform their functions and exercise their powers where such capacity is lacking; and
- Promote the equitable distribution of resources between the local municipalities in its area to ensure appropriate levels of municipal services within the area.

Metropolitan municipalities have the combined powers and functions of both district and local municipalities.

2.6.3 Department of Local Government

2.6.3.1 Back to Basics Programme

In addition to the roles and responsibilities of the three spheres of government in the aforementioned section, in 2014 the National Department of Cooperative Governance and Traditional Affairs (COGTA) adopted a new approach to revitalise and strengthen the performance of local municipalities by introducting the "Back to Basics" programme which rests on five pillars, namely:

- Putting people first;
- Adequate and community-oriented service provision;
- Good governance and transparent administration;
- Sound financial management and accounting; and
- Robust institutions with skilled and capable staff.[4]

It is noted that the above pillars are aligned with the Provincial Strategic Goals (Table 3) and can be reached by implementing the "Back to Basics" programme by creating conditions to consistently deliver municipal services of the right quality and standard. This includes planning, delivery and maintenance of infrastructure amenities. Quarterly performance monitoring and reporting needs to be undertaken on the work of the municipalities in order to improve the political management of municipalities to be responsive to the needs and aspirations of local communities.

[4] DEADPs Municipal Support & Capacity Building Strategy for 2015/16

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The Waste Directorate regularly attends the Back to Basics meetings in order to monitor and support municipalities wrt relavant waste related issues covering integrated waste management planning, licensing and policy and minimisation.

The municipalities currently receiving support under the Back to Basics programme are Central Karoo District Municipality, Beaufort West, Prince Albert, Laingsburg, Swellendam, Matzikama, Cederberg, Cape Agulhas, Kannaland and Oudtshoorn municipalities.

2.6.3.2 Standard Operation Procedure (SOP) for coordination of DEADPs involvement in the annual Municipal Integrated Development Plan & LG MTEC ("Joint Planning") Processes (Approved 29 May 2015)

In terms of the Local Government: Municipal Systems Act (Act No.32 of 2000) the Department of Local Government ("DoLG") during the first year of the five-year Integrated Development Plan (IDP) cycle coordinates the process of IDP assessments undertaken by each municipality together with all the national and provincial sector departments to ensure that the planning of the municipality and that of the provincial and municipal departments are aligned, as well as to ensure that the municipality's IDP (and all the associated sector plans) comply with the relevant procedural and content requirements. During the outer four years the DoLG coordinates the process through which the municipality and all the national and provincial sector departments assess the performance of the municipality in terms of the implementation of the IDP (and all its associated sector plans) together with changing circumstances (which could include shifts in national and/or provincial strategies) which calls for corresponding amendments to the municipality's IDP (and its asociated sector plans). The Local Government Expenditure Committee ("LG MTEC") engagements undertaken in terms of the Local Government: Municipal Finance Management Act (Act No. 56 of 2003) complements the IDP assessment process by assessing, amongst others, the financial sustainability and budget responsiveness. Compliance and Performance KPIs related to waste management planning, policy and minimisation and licensing were formulated and used within the Department by the Waste Directorate to assess the municipality's IDPs during the LG MTEC process but are also used to monitor and support the municipalities on an on-going basis. The Department of Local Government is currently developing a web-based tool called mGAP to monitor and support municipalities. The Department's Waste Directorate has developed KPIs which will be incorporated into the tool. These KPIs will in future be used during the LG MTEC process to assess municipal IDPs.

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2.7 Summary of Chapter 2

This Chapter provided an overview of the constitutional and legal framework pertaining to waste management. It highlighted the recent changes to the law reform and South Africa's obligations and agreement with International Treaties with regards to hazardous waste, its production and the treatment thereof. It explained the designated authorities at national, provincial and local level in the waste sector and the strategic goals and objectives developed by the WCG and the Department which has a direct bearing on future directions for waste management in the Western Cape. This Chapter ended with the division, functions and powers between district and local municipalities as well as programmes to strengthen the performance of local municipalities.

The next Chapter outlines the current pressures driving waste generation and the many challenges municipalities face related to waste management. It gives an overview of the Western Cape demographics and various national and provincial planning areas relating to integrated sustainable waste management in the Western Cape to ensure environmental, social and economical sustainability through various programmes.

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3 CHAPTER 3: LINKS TO OTHER POLICY AREAS

3.1 Introduction

The following section highlights the key waste management challenges faced by South Africa and the Western Cape province. It describes the drivers impacting waste generation and the WCGs response to enable a resilient, inclusive living and low carbon province in South Africa and leading green economic hub of the African continent.

3.2 Our current state of waste management

Waste generation is a direct consequence of an increase in population, a rise in living standards, rapid urbanisation and economic growth. More people are moving into cities in search for employment and a better quality of life with better access to infrastructure and services. These have implications for planning, service provision and resource consumption and are key demand side pressures for the province.

Between 2001 and 2010 the volume of waste generated in the Western Cape increased by some 18% per annum (WC PSDF 2014). This far exceeded the rate of population and economic growth. In 2012, the waste generated in the province amounted to 3.8 milliontonnes[5]. In South Africa, domestic waste generation per capita varies between different income groups, with low, middle and high income groups ranging from 0.41, 0.74 and 1.29kg/c/day respectively (Oelofse & Godfrey 2009). The generation rates and waste produced across income groups serves as an index which can be used in assessing the level of sustainable development in terms of environmental governance (Mesjasz-Lech 2014).[6]

The state of waste is a result of poor waste planning and has become a growing environmental problem at national, regional and local level. The main method currently used to manage waste is disposal at waste disposoal facilities (WDFs). Approximately 90% of waste generated in South Africa end up at WDFs. Currently, the Western Cape has 164 general WDFs, 3 hazardous WDFs, with limited accredited hazardous waste laborataries, and 3 healthcare risk waste treatment facilities. Between January 2014 and November 2015 the total quantities of hazardous waste disposed of at the Vissershok Private WDF (H:H), CCT (H:h) WDF and PetroSA (H:H) WDF amounted 1.1 million tonnes, 40,778 tonnes and 9,543m^3 respectively.

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[5] This is a mean waste generation figure which was based on four methods used to calculate waste generation in the 1st Generation Western Cape Integrated Report (2011).

[6] Environmental governance refers to the processes of decision-making involved in the control and management of the environment and natural resources. It is also about the manner in which decisions are made – are they made behind closed doors or with input from the broader public? Principles such as inclusivity, representivity, accountability, efficiency and effectiveness, as well as social equity and justice, form the foundation of good governance. Good environmental governance should reflect our best understanding of the structure, function, processes and variability that typify natural systems. Without this understanding, inappropriate decisions can be made with catastrophic environmental consequences, even with the best possible intentions http://soer.deat.gov.za/dm_documents/Environmental_Governance_-_Background_Paper_WU45Q.pdf [accessed 12 September 2015]

The province experiences key challenges such as shortage of airspace and securing available land for new WDFs is proving difficult as there is increasing competition for land development, thus putting pressure on land resources in areas surrounding cities. Other challenges include the costly containment barrier requirements for WDFs. To date, integrated waste management infrastructure has not been recognised as bulk infrastructure and therefore National, Provincial and Municipal funds have not specifically been allocated in new developments, resulting in backlogs in service delivery and limited landfill airspace[7]. Regionalisation is debated as a potential solution to airspace shortages.

Municipalities are daily faced with significant challenges with regard to waste management. These challenges are limited financial resources as a result of capping budgets, ineffective cost recovery for disposal at WDFs, delays in finalising municipal budgets, theft of infrastructure, reduced operational budgets and the ineffective use of equipment and personnel (Oelofse & Godfrey 2009). The clearing of illegally dumped waste costs the CCT approximately R350 million annually[8]. In certain municipalities, at least 80% of the municipal operation budget is allocated for the collection and transportation of waste. Another financial sustainability risk is the high capital and operating cost of servicing low density settlement patterns. Waste management challenges are further compounded with the current skills shortage around waste management services with high staff turnover occurring in municipalities.

Waste Mangement is an integral part of the overall national government planning systems as a wider approach to sustainable development and to achieve the overall goals as set out in the NWMS. National government is committed to tackle the problems effectively by promoting sustainable waste management practices to ensure a sustainable future. The WCG influences national law reform by providing comments on new legislation and through discussions held at Working Group 9 meetings.

[7] Western Cape Government: Strategic Five Year Plan (2015)
[8] http://www.capetown.gov.za/en/Pages/Cityofferscashrewardsflushoutillegaldumpers.aspx [accessed 18 January 2016]

In recent years the Western Cape has made significant strides in improving waste management and more importantly the integration of sustainable practices that recognises waste as a resource rather than a liability and a nuisance. Examples of these are an in-depth waste characterisation survey conducted in 2007 to improve the quality of information on the various waste streams that are generated within municipalities, the 2Wise2Waste resource efficiency programme, waste management in education project, green procurement guideline, facilitating recycling amongst industry, municipal officials and communities and the annual Cleanest Town Competition. However, there is still room for improvement as the province builds on its current achievements (SoEOR 2013). Therefore, this Chapter builds on the premise of the Provincial Strategic Goal 4 to ***"Enable a resilient, sustainable, quality and inclusive living environment"***and DEADPs Strategic Objective "***Maintenance and sustainable use of agricultural and ecological resources and infrastructure"*** and brings together key relevant information as gleaned from National and Provincial Frameworks and studies that have a direct relationship and influence on any element of waste management in the province.

3.3 Status of factors affecting waste generation

This section deals with factors influencing waste generation in the Western Cape province. These are population growth, employment, economic development and urban growth. As the province urbanises, the population becomes wealthier, material consumption increases and produces about twice as much waste as their rural counterpart. Geography (rural versus urban) influences waste composition and the income level of a household.

3.3.1 Population

In 2013 the Western Cape represented 11.4% (approximately 6 million) of the total population in South Africa. Cape Town is the capital of the province and other major cities and towns include George, Knysna, Paarl, Swellendam, Oudtshoorn, Stellenbosch, Worcester, Mossel Bay and Saldanha Bay. The majority of the population (74%) is concentrated in the Cape Metro region. High population densities are located along the coastal belt.

The Western Cape experiences a growing population largely due to in-migration of people from other provinces and international immigrations. The population is expected to grow from 5.82 million people in 2011 to 7.36 million people in 2040 (Figure 5). This represents an average annual population increase of approximately 0.81% (compounded growth) and by approximately 1.54 million people over this period.

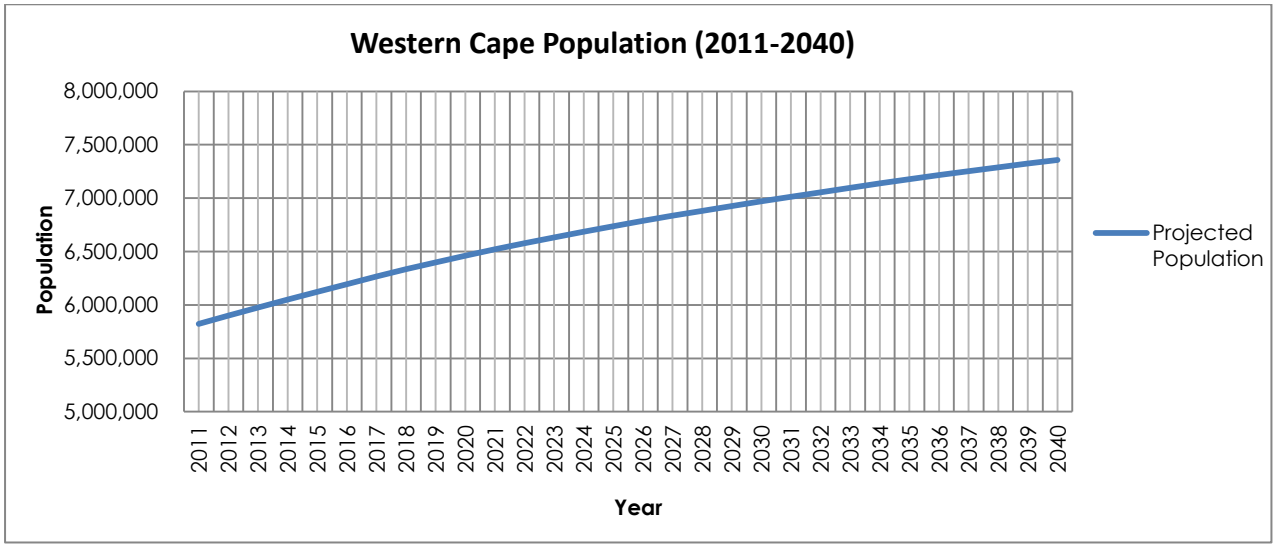


Figure 5: Population projections for the Western Cape province: 2011 – 2040 (Source: WCG: Department of Social Development 2014)

3.3.2 Employment

The largest increase in employment creation between 2008 and 2013 was within the Government sector followed by the Finance, Retail and Services sectors. This is indicitive to the type of economy the Western Cape has, namely a service economy. An increase in employment within these sectors indicates a stronger economic base with more high-skilled and high-paid labour, and a corresponding growing demand for goods and services (Wesgro 2014). It is estimated that 75% of the province's expanded labour force is employed with the informal sector accounting for 11% of the provincial employment.

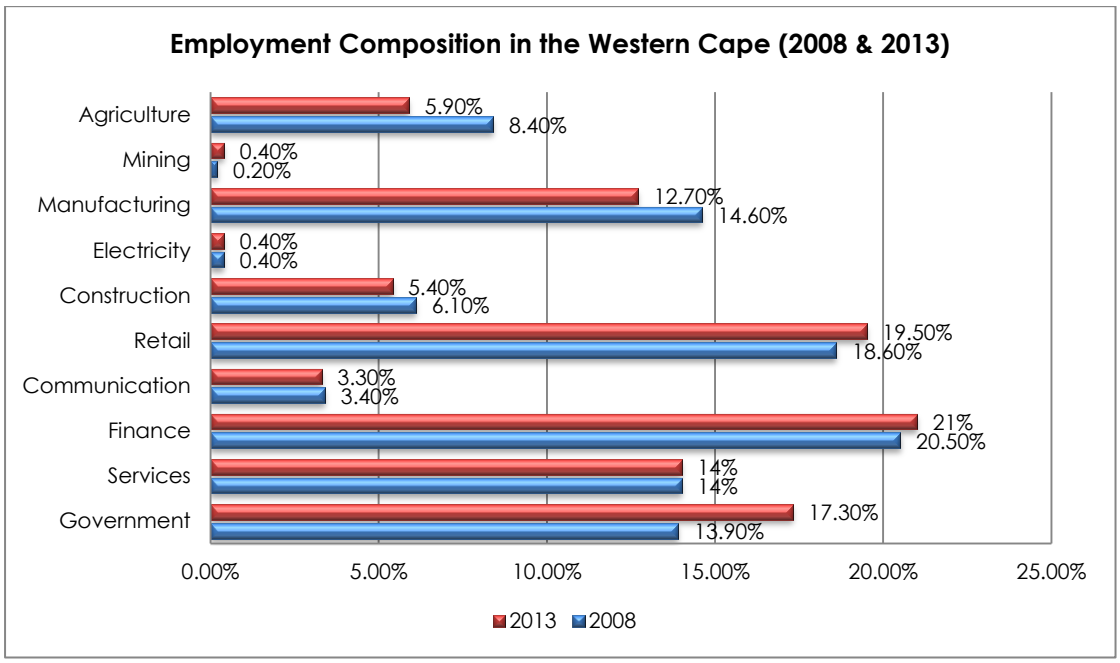


Figure 6: Employment composition in the Western Cape: 2008 – 2013 (Source: Wesgro 2014)

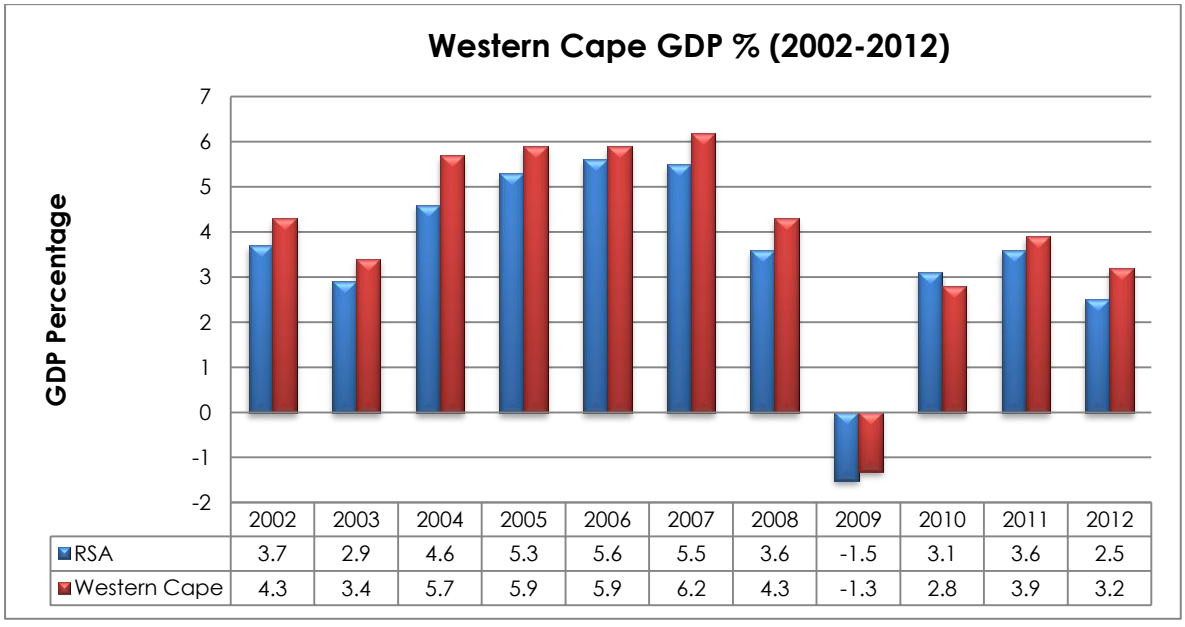
The 2008/09 global economic downturn gave rise to widespread unemployment in South Africa, especially amongst the youth. StatsSA data shows that the current employment levels in the Western Cape are slightly lower than in 2008. This can be attributed to the recession which is still the case today.

It is estimated that unemployment in the Western Cape increased from 393,000 to 552,000 people (2008 - 2013) and the number of jobs declined by 7%. The total number of unemployed individuals has grown by 5.6% per annum over this five year period. Job losses were mostly in the formal and informal agricultural sector (from 8.4% in 2008 to 5.9% in 2013). Young adults in the province are more likely to be unemployed, accounting for more than two thirds of the unemployed workforce. Of these young adults 51.4% have not completed secondary education and 28.7% have not completed matric. Overall unemployement is more prevalent amongst females and Africans[9].

In terms of employment in the Western Cape waste sector, it is estimated that the recycling industry currently creates approximately 18 000 jobs (2014 figures) with a projected 19 450 jobs in 2019 (Green-Cape 2015).

3.3.3 Economy

The Western Cape economy contributes approximately 14%[10] to South Africa's GDP and is a major agricultural export area, the centre for the fisheries industry and the most valuable tourist destination in South Africa. Cape Town remains the economic hub of the province, contributing to 85% of the GDP.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RSA	3.7	2.9	4.6	5.3	5.6	5.5	3.6	-1.5	3.1	3.6	2.5
Western Cape	4.3	3.4	5.7	5.9	5.9	6.2	4.3	-1.3	2.8	3.9	3.2

Figure 7: Western Cape GDP: 2002 – 2012 (Source: Wesgro 2014)

[9]Western Cape Government: Strategic Five Year Plan (2014)
[10]Statistics South Africa, 2013

In 2007, 2008 and 2012 the Western Cape economic growth outperformed that of the national economy by 0.7%. The Western Cape has followed the national slowdown, with growth of 3.2% achieved in 2012, marginally above the national average of 2.5%. GDP growth in the Western Cape is expected to consistently outperform national GDP growth into the future. This is due to the fact that the structure of the regional economy differs significantly from that of the national economy. The regional economy is a service based economy with strong agricultural exports (Wesgro 2014).

Figure 8 depicts the main sector contributors to the Western Cape economy for the years 2003 and 2012.

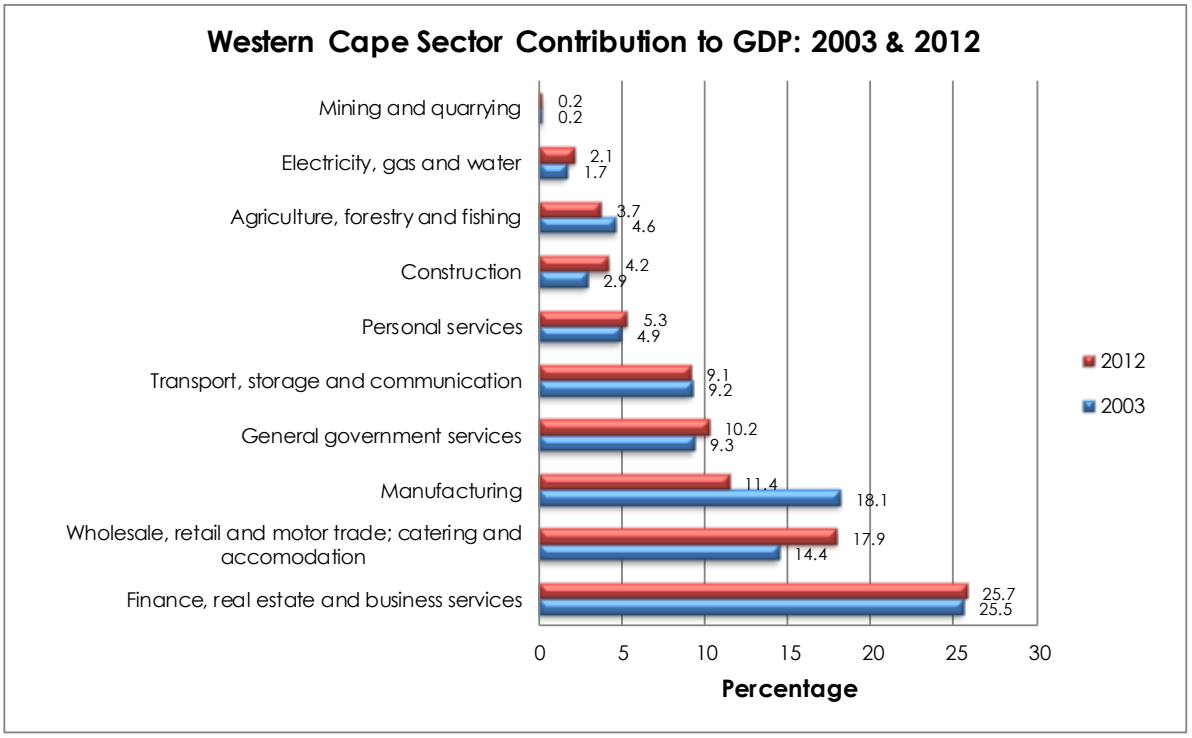


Figure 8: Contribution by sector to Western Cape economy (Source: Wesgro 2014)

The tertiary sector[11] is the largest contributer of all sectors and contributed 68.2% in 2012. The financial, real estate and business services remained the highest contributor to the Western Cape economy since 2003. The manufacturing sector's contribution towards the GDP experienced a major decline from 18.1% in 2003 to 11.4% in 2012. Overall the province's economy is expected to grow at 3.6% over the next five years. This is higher than the expected national growth over the same period which is forecasted at 3.3%.

[11]Tertiary sector: involves the selling of services and skills and include the health service, transportation, education, entertainment, tourism, finance, sales and retail.

The Western Cape Industrial Symbiosis Programme (WISP) supports private sector investment in building value chains that enable economic value to be derived from commercial, industrial and agricultural waste. It is a resource efficiency approach where one company's unused or residual resources are used by another, for mutual benefit, leading to a more resource efficient and lower carbon economy. Large amounts of wood, plastics, food/agricultural waste and fabric (textiles and carpeting) are currently under-used and ends up at waste disposal facilities. These could be readily diverted if there was available recycling capacity. Since its inception in 2013, WISP has enabled significan cost savings to its members and created new opportunities for jobs. Benefits achieved for the period August 2013 to February 2015 are waste diversion of 284 tonnes with direct job creation of 10 permanent and 11 temporary jobs (Green-Cape 2015).

3.3.1 Income inequality and development

Income inequality and poverty has a direct correlation with health and social problems. Environmental degradation is a result of economic inequality and analyses indicate that there is a negative correlation between income inequality and environmental sustainability. Evidence suggests that the higher the income inequality the worse the environmental indicators (i.e. waste production, biodiversity loss and environmental composite indices).[12]

As per Table 4 the Gini coefficient[13] in the Western Cape and its municipalities are between 0.57 and 0.61 indicating a high level of inequality. However, improvements are evident in the more rural districts (i.e. Central Karoo).

Table 4: Gini coefficients for the Western Cape municipalities[14]

Municipality	2001	2013
City of Cape Town Metro	0.61	0.61
West Coast District	0.59	0.57
Cape Winelands District	0.61	0.60
Overberg District	0.59	0.58
Eden District	0.60	0.60
Central Karoo District	0.59	0.57
Western Cape Province	0.61	0.61

[12] http://www.shapingtomorrowsworld.org/hauptInequality.html [accessed 26 February 2016]
[13] The gini coefficient measures income inequality. It is measured from 0 to 1, where 0 corresponds with perfect equality (everyone has the same income) and 1 with perfect inequality (where one person has all the income and everyone else has zero income), PSP 2014 -2019.
[14]Western Cape Government: Provincial Economic Review and Outlook (2015)

Table 5 depicts The Human Development Index[15] (HDI) in the Western Cape. The HDI has increased between 2001 and 2013. This indicates an improvement in socio-economic conditions. Central Karoo District Municipality experienced the greatest improvement (0.1 increase).

Table 5: Human Development Index for the Western Cape municipalities[16]

Municipality	2001	2013
City of Cape Town Metro	0.68	0.73
West Coast District	0.60	0.68
Cape Winelands District	0.60	0.68
Overberg District	0.61	0.68
Eden District	0.62	0.69
Central Karoo District	0.54	0.64
Western Cape Province	0.66	0.71

The income inequality in the Western Cape is still high during the periods 2001 and 2011 whereas the human development index for 2013 (at 0.71) indicates a medium level of human development.

3.3.2 Urban growth

Urbanisation is one of the biggest challenges faced globally and the Western Cape is no exception. The influx of people into urban areas, as stated earlier, puts strain on the current service delivery backlogs.

3.3.2.1 Informal settlements

The number of households living in informal settlements in the CCT was 198 000 in 2012 and is predicted to rise to 260 000 households in 2019. The persistence of informal settlements with poor living conditions have a signifant impact on the environment as a result of the lack of access to basic services (electricity, water, sanitation and refuse removal) thus leading to illegal dumping, waste ending up in rivers and burning of waste causing land, water and air pollution[17]. This is compounded due to the unsuitable location of these settlements and the close proximity to natural features and flood-prone locations which directly and indirectly affects water quality. The STATS SA 2011 data for the CCT indicated that there is also an increase in informal backyard housing in formal housing areas (4.3% in 2001 to 13.5% in 2011).

[15] The Human Development Index (HDI) attempts to quantify the extent of human development of a community and is based on measures of life expectancy, literacy and income. It is seen as a measure of people's ability to live a long and healthy life, to communicate, to participate in community life and to have sufficient resources to obtain a decent living. The HDI can assume a maximum level of 1, indicating a high level of human development, and a mimimum value of 0..
[16] Western Cape Government: Provincial Economic Review and Outlook (2015)
[17] Western Cape Government: Environmental Affaris and Development Planning: State of Environment Outlook Report for the Western Cape Province: Human Settlements Chapter (2013)

According to the 1996, 2001 and 2011 StatsSA data, the percentage of formal dwellings in the province showed slight fluctuation with the 2011 Census figure decreasing by 0.9 % from the 2001 Census. Conversely, the prevalence of informal dwellings shows a slight increase from 16.7 % of households in 1996 living in informal structures, to 18.2% in 2011 (the number of households increased from 162 873 in 1996 to 189 545 in 2001 to 297 017 in 2011) (StatsSA 2012).

3.3.2.2 Housing and municipal services

The CCT holds 56% of registered housing applicants in the Western Cape. As at September 2015, a total of 496 726 households were registered on the Western Cape Demand Database.

Access to running water, sanitation and weekly refuse removal in the Western Cape is shown in Table 6.

Table 6: Percentage of households with access to four main municipal services (2014) (PERO 2015)

Description	Access to mains electricity	Access to piped water	Access to sanitation	Refuse removal once a week
Western Cape	87.6%	98.9%	94.6%	89.2%
South Africa	86%	90%	79.5%	63.8%

As can be seen in Table 6, the Western Cape remains above the national average.

3.3.2.3 *Human settlements*

Figure 9 indicates an overall picture of human settlements growth in the Western Cape province for the years 1992 to 2009. This provides the trends in spatial development[18]. The red areas indicate the most change and these are located in the CCT (northern suburbs), Vredenburg and Langebaan, Mossel Bay, George, Knysna and Plettenberg Bay and rural towns such as Malmesbury, Worcester, Wellington, Robertson, Caledon, Oudsthoorn, Bredasdorp, Swellendam, Riversdale and Beaufort West. The blue areas indicate the least change such as the southern suburbs of the CCT and areas in Overberg, Eden and Cape Winelands DMs.[19]

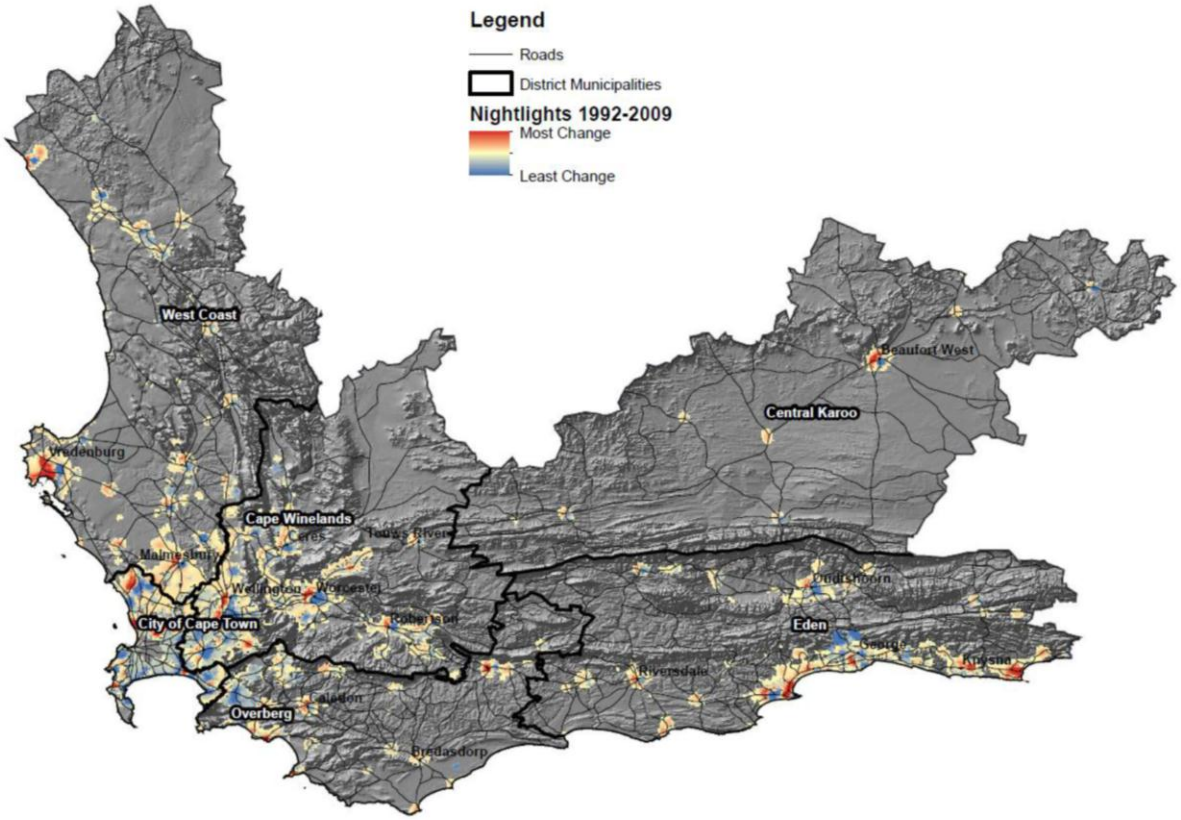


Figure 9: Night lights aerial photography for the Western Cape (NASA night lights satellite images)

The Port of Saldanha has experienced high levels of growth due to the infrastructural expansion relating to the deep water port for the export of iron ore and bulk crude oil, a growing number of industrial developments and residential areas. Large tracts of vacant land have been rezoned within Saldanha to industrial land, specifically for incorporation into the planned Industrial Development Zone (IDZ) which envisages the development of a multi-port facility[20].

[18] The figure does not provide the transformation of land from one use to another.
[19] Western Cape Government: Environmental Affaris and Development Planning: State of Environment Outlook Report for the Western Cape Province: Human Settlements Chapter (2013)
[20] Western Cape Government: Western Cape Provincial Spatial Development Framework (2014)

3.3.2.4 *Spatial development*

In the national context the NDP has identified the following critical action with respect to urbanisation:

"New spatial norms and standards – densifying cities, improving transport, locating jobs where people live, upgrading informal settlements and fixing housing market gaps."[21]

It is with this action in mind that the National Planning Commission called for a National Spatial Framework which encompasses principles that seek the reversal of spatial segregration, sustainable consumption patterns, resilience to environmental degradation, access and inclusion of people with disabilities and efficient commuting patterns and circulation of goods. In order to meet these national objectives as well as to give effect to the Provincial Strategic Objectives, the Western Cape developed a Provincial Spatial Development Framework (PSDF) in March 2014. This provides a policy framework in which to roll-out the Western Cape's spatial agenda and to open up new opportunities. These are:

- ***Resource Management:*** Proactive management of resources as social, economic and environmental assets supported by sustainable living technologies;
- ***Space-economy***: Spatially aligned infrastructure, prioritisation and investment to increase access to opportunities and balance the rural and urban space-economy;
- ***Settlement:*** An urban rather than suburban approach to settlement which promotes intensity, integrations, consolidation and sense of place.

Various growth management zones anticipated to experience rapid growth, have been identified in the PSDF. One such zone is the resource related port and industrial development in Saldanha Bay and surrounding areas. The zone is intended to become an oil, gas, and marine repair, engineering and logistics services complex, targeting upstream exploration and production services. An offshore supply base (Transnet National Ports Authority) will be developed to supply rigs with food, materials and waste collection services. It is estimated that at least 6 300 direct jobs and a further 25 200 indirect employment opportunities may be created (PERO 2015) as a result of the Saldanha Bay industrial development. Specific waste management infrastructure and upgrades will be required for the planned IDZ due to limited waste management facilities to cater for future waste generated by the IDZ.

The PSDF composite map is an important spatial planning and land use management tool and graphically portrays the Western Cape's spatial agenda (see Figure 10 below). In line with the Provincial spatial policies, the map shows what land use activities are suitable in different landscapes and highlights where efforts should be focused to grow the Provincial economy.

[21]National Development Plan 2030 (2012)

An informant to the PSDF is the Growth Potential of Towns Study (2012/13) that determined the growth potential and socio-economic needs of settlements in the Western Cape (outside of the City of Cape Town) using quantitative data (i.e. socio-economic, economic, physical-environmental, infrastructure and institutional indicators). The results of the quantitative analyses were then combined with qualitative information (e.g. stakeholder engagements) to identify potential interventions that might unlock latent potential within settlements and regions, as well as identifying those areas that have the greatest growth potential, as well as those areas that have great socio-economic needs[22].

The settlements that have been identified as having very high growth potential are Paarl, George, Stellenbosch, Knysna, Mossel Bay, Betty's Bay/Pringle Bay, Hermanus/Onrus/Hawston, Malmesbury and Vredenburg. The settlements that have been identified as having very high socio-economic need in the Province are Wellington, Worcester, George, Mossel Bay, Paarl and Stellenbosch. Reviewing of refuse collection, cleaning and improvements in waste management services are key in order to factor the potential of higher waste volumes as a consequence of economic growth.

The PSDF identifies priority urban functional regions, being the Cape Metro functional region, as well as the emerging regional centres of the Greater Saldanha functional region and the George/Mossel Bay functional region. The priority tourism/leisure corridors are the Overstrand and Garden Route leisure corridors, whilst the tourism routes are the N2-corridor, R62 between Worcester and Oudtshoorn, N7-corridor and R43.

The functional regions consist of overlapping municipalities which means cross cutting municipal borders in terms of regional economic infrastructure networks, water catchment areas, bio-regions and ecological corridors, scenic and cultural landscapes, space-economy (interlinked nodes of activity) and conurbations.

Two rural development corridors – areas of agricultural and rural development opportunity – have been identified. The first is located along the west coast – stretching from Lutzville in the north to Clanwilliam in the South. The second rural development corridor stretches from Tulbagh in the north-west to Swellendam in the south-east[23].

[22]Western Cape Government: Provincial Strategic Plan 2014 - 2019
[23]Western Cape Government: Provincial Strategic Plan 2014 - 2019

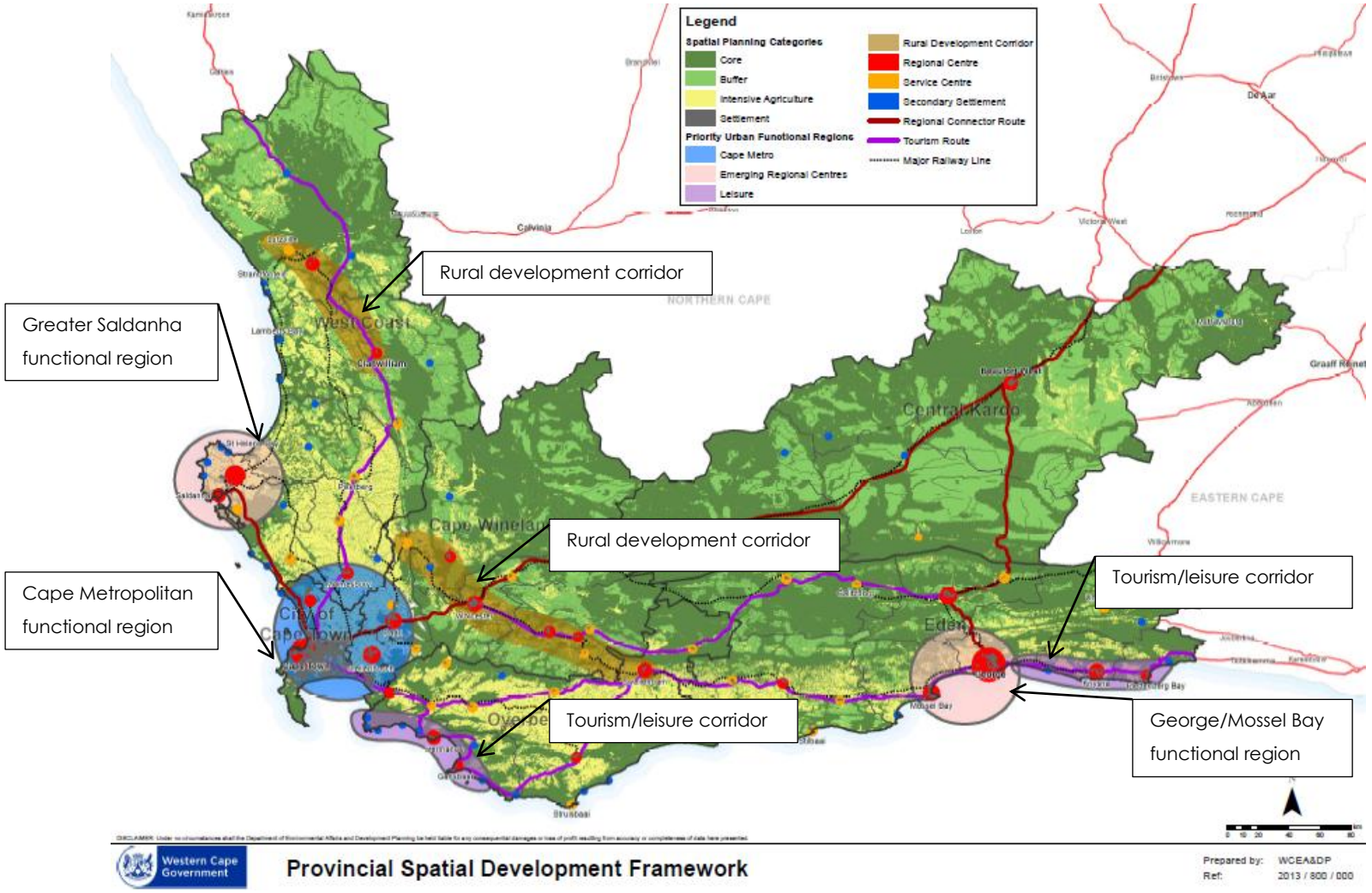


Figure 10: **PSDF composite map**

3.3.2.5 Land use

The WC PSDF (2014) aims to change the current emphasis for settlements from "greenfields" developments and low density sprawl to "brownfields" developments.

A Greenfield development is one whereby undeveloped land is used for a new public or private project[24]. These projects could have a detrimental effect on the province's natural resources. Brownfield developments are projects whereby the land used was previously occupied but has been vacated, derelict or contaminated[25]. These sites usually require preparitive work prior to the new development proceeding.

The WC PSDF (2014) acknowledges that compromises must be made in pursuing the province's spatial goals. It states that "risks associated with implementing the transformation agenda (e.g. urban compaction requires more 'brownfields' development where land is expensive, often difficult to procure, and opposition from 'not in my back yard' factions is likely)"[26].

The OneCape2040 attempts to achieve a resource efficient Western Cape to mitigate environmental and regulatory risk and seize opportunitis of a post-carbon future with Transtition 3: ***Green Cape (ecological transition)***. This requires moving from unsustainable carbon-intensive resource use to sustainable low carbon resource use. Its goals is that all people have access to water, energy and waste services that are delivered on a sustainable resource-efficient manner. The Western Cape is a recognised leader and innovator in the green economy (OneCape2040 2012).

The OneCape2040 identifies the key lever in achieving the transition energy and water infrastructure and regulation geared to sustainable resource use and innovation and the fast tracking of the green agenda incentivised (OneCape2040 2012).

[24]http://www.businessdictionary.com/definition/greenfield-site.html
[25]http://www.webopedia.com/TERM/G/greenfield.html
[26] Western Cape Government: Western Cape Provincial Spatial Development Framework (2014)

3.4 Envisioning the future

3.4.1 Building economic sustainability

The National Development Plan 2030 (NDP) has revealed the following on economic development in South Africa:

"Economic development is uneven, with some places growing more quickly than others. National spatial policy needs to support the major centres of competitiveness where jobs can be most efficiently produced."[27]

As a developing country economic growth is a critical factor for the progress of the nation as it creates jobs and opportunities for poor people. It is with this in mind that the NDP has identified poverty alleviation and inequality reduction as key objectives so that all South Africans have access to resources and opportunities. The NDP seeks to achieve the following:

"Eliminate income poverty – Reduce the proportion of households with a monthly income below R419 per person (in 2009 prices) from 39% to zero. Reduce inequality – the Gini coefficient should fall from 0.69 to 0.60".[28][29]

The Medium Term Strategic Framework (2014 – 2019) (MTSF), the national implementation framework for the NDP, serves as the principle guide to the planning and allocation of resources across all spheres of government over the 2014 – 2019 period. It advocates inclusive economic growth and states that in order to achieve a steady growth in total GDP, a minimum of 5% per year should be achieved to ensure the alleviation of poverty and inequality as well as improved employment rates by 2030.

The OneCape2040 aligns with the MTSF and envisions a transition towards a more inclusive and resilient economy for the Western Cape and with Provincial Strategic Goal 1 ***"create opportunities for growth and jobs",*** an essential ingredient for achieving inclusive growth[30]. Key priority projects have been identified as catalysts for improving peoples's lives. One such key project is ***"The Economy: People and Power"***. The Western Cape realises that jobs and growth are the number one priority and aspires our youth to a future in which they can be responsible adults. Skills development in priority sectors (i.e. green economy, oil and gas services, tourism and agri-processing) and energy security have been identified as game changers with key levers such as enhanced energy efficiency at both households and businesses.

[27] National Development Plan 2030 (2012)
[28] National Development Plan 2030 (2012)
[29] The Gini coefficient in the Western Cape is slightly higher (0.61) than the desired Gini coefficient (0.60)
[30] Inclusive growth creates access to opportunity that allows people to contribute to and benefit from economic growth (Provincial Economic Review and Outlook, 2015)

Through this, accelerating jobs in three priority sectors: tourism, agri-processing and oil and gas services, the centrepiece of the Western Cape economic strategy, can be achieved.

Box 1: Project Khulisa[31]

Jobs and growth

The purpose of this project is to accurately identify the parts of the Western Cape economy with the greatest potential for accelerated, sustained growth and job creation, and then double down on driving the specific actions that government and business can take to unlock that potential.

Project Khulisa is one of the major projects in the implementation of Strategic Goal 1, ***to create opportunities for growth and jobs***, and specifically contributes toward providing support to key strategic sectors.

It focuses on productive and enabling sectors that contribute to the region's competitive advantage and/or having the potential to be catalytic in growing the economy. The sectors identified in this regard include tourism, agri-processing, and oil and gas (rig repair) with particular focus placed on them over the next 3 to 5 years.

Source: Provincial Economic Review and Outlook, 2015

The Western Cape is recognised internationally as an entrepreneurial destination of choice and the goal is that any person who wants to be economically active is able to secure work (OneCape2040 2012).

[31] Khulisa means "cause to grow" in isiXhosa

3.4.2 Recognising environmental sustainability and resilience

"Absolute reductions in the total volume of waste disposed to landfill each year" (NDP 2012)

The PSP (2015) notes that the resource base is under severe pressure, both due to its management and the increasing pressures that a growing population brings. It is noted that factors such as waste, water, energy, transport, resource-use and pollution are leading to extensive environmental degradation which in turn results in the degradation of social and economic conditions.

The OneCape 2040 identified a key priority project ***"Better Living: addressing the apartheid legacy"*** as most cities, including Cape Town, are still grappling with the apartheid legacy of housing backlogs and rapid urbanisation. This key project has 2 game changers, the **(1) Better Living Model** and **(2) Sanitation**. The better living model is focused specifically on the City of Cape Town with a prime 22 hectare site for a mixed-use, mixed income and tenure residentially-led development which will ultimately become a model for other developments in the pipeline. Game changer 2 addresses informal settlements and the associated challenges such as sanitation. The focus will be on informal settlements that are not currently part of urban upgrade plans (PSP 2015). The better living model leverages optimisation of land use through densification and integration, better living and improved spatial functioning of centres.

The Informal Settlement Upgrading Programme (ISUP), led by the Department of Human Settlements, will conduct studies to determine the suitability of long term development of informal settlements with incremental upgrading receiving priority to ensure implementation of basic services in informal settlements. Importantly, is to do things differently and more effectively within the constraints and resources, land, social dynamics and related matters (PSP 2015).

The provincial spatial policy ***'Policy R4: Recycle and recover waste, deliver clean sources of energy to urban consumers, shift from private to public transport, and adapt to and mitigate against climate change'*** aims to address waste related challenges by:

- Learning lessons from the City of Cape Town's recycling programme, mainstream recycling and recovery of waste in the high waste generation areas of the Province to unlock economic opportunities and increase the lifecycle of current waste disposal facilities by applying the principles of 'reduce, reuse, recycle';
- Close down illegal sites and locate new regional waste disposal facilities adjacent to rail facilities in order to decrease the operational costs and energy requirements associated with the need for road freight.

Major improvements in waste infrastructure and systems management will reduce costs, creates opportunities and reduces environmental risk. The OneCape2040 vision for 2040 is zero waste, a great place to live and visit of the greenest region on the globe.

Box 2: Solid Waste in our Environment – out of sight out of mind

As much as 80% of all solid waste present within our aquatic environments is made up of plastic (Valavanidis and Vlachogianni 2011), with the presence of plastic bottles, caps and bags making up the top five items of solid waste found in marine environments around South Africa (Ocean Conservancy 2014). In terms of actual coverage, it is estimated that as much as 88% of the ocean's surface contains some form of plastic debris (Cózar et al. 2014), increasing the concern for marine life and the consequences for the complex marine food chains which are vital for sustaining marine fishery industries (worth between R 6 - 7 billion in South Africa – Department of Agriculture, Forestry and Fisheries 2014). One of the major sources of entry for plastic to enter the ocean is through stormwater run-off from our cities and streets, carrying litter and debris into our river systems, essentially acting as a conduit for the flow of plastic and other solid waste out to sea. The impacts most often seen include those highlighted in the images below.

A major contributing factor to the significant rise in solid waste in our aquatic environments is the current lack of focus and impetus given to effectively managing solid waste within the context of stormwater. Generally stormwater is known as one of the most significant factors impacting on water quality for both freshwater and marine resources, due to the lack of regulations managing their control and discharge (Rippy et al. 2014; Walsh 2000). Concerns around managing water quality are often placed on chemical and biological factors further neglecting the impact of solid waste. The physical impact of plastic and other debris is easily identified in terms of aquatic species and the amenity value of an environment, however most of the impacts created by solid waste within aquatic environments are largely unknown (Cózar et al. 2014; Valavanidis and Vlachogianni 2011). The degradation of plastics over their lifetime and the leaching of their constituent chemicals are deemed to significantly impact on the health of aquatic organisms and environments. Despite the current and potential impacts experienced by these environments there continues to be a lack of required integration amongst relevant government departments and agencies to effectively address solid waste and stormwater. The lack of integration means that often the solid waste is allowed to flow out to sea, out of sight and out of mind.

Improvements to reduce solid waste and the impact of stormwater will rely on a broad based approach targeting sources of such pollution, as well as further preventative measures to protect receiving environments. In this way effective policy and legislation need to drive awareness and campaign for a radical shift, required to alter the current trajectory and impact our urban environments have on the natural environment, both near and far, to sustain our resources.

(Source - www.oceanhelathindex.org)
Albatross chicks have been known to starve to death due to the parents feeding them plastic debris found in the open ocean.

(Source – www.aquascapeconservation.org)
Entanglement can cause severe deformity and even death for those species unfortunate enough to be caught.

(Source – www.protecttheoceans.org)
Turtles can mistake plastic bags for jellyfish, a common food source, causing severe illness and likely death once ingested.

Source: DEADP: Directorate: Pollution and Chemicals Management, 2015

Box 3: Genius of Systems for People's Access to a Clean Environment (SPACE) –

Community Managed Solutions

The Berg River Improvement Plan was adopted in 2012 with the specific focus of prioritising tasks to address the risk posed by deteriorating water quality on the agricultural economy of the area, one of the most important export producing catchments in the Western Cape. One of these tasks focuses specifically on the need for the effective upgrade of informal settlements. The lack of adequate basic services and often the difficulty in providing these services results in significant impacts on the environment, specifically freshwater resources into which much of the polluted streams and flows drain into. However, out of this perverse poverty lies opportunity, by embracing informality in terms of its adaptability, the implementation of innovation is deemed far easier and more relevant than in retrofitting developed, formal settlements. Through the conceptual development of the project, the objective was to address the stormwater-solid waste-wastewater nexus, in terms of feasible solutions which would reduce and allow for improved management of these waste flows. Through an understanding that existing formal mechanisms only serve to divert, dilute and transfer such impacts, the opportunity for innovative mechanisms to address these waste flows for the conversion into resource opportunities was investigated. Based on the philosophy of biomimicry, an understanding of how nature manages similar identified problems, interventions were developed for the management of open drainage canals and solid waste within the Langrug Community, outside Franschhoek. These interventions aim to adapt ecosystem services, by implementing green infrastructure, for the improved management of the open drainage canals in such a way that slows the flow of the water, allowing for improved catchment of run-off and grey water for effective biological treatment. The implementation of the green infrastructure within the community is to be done by the community, with technical and professional oversight and support. The green infrastructure is designed to be such, that the provision and need formaintenance and operation services, stimulates small-scale economic activities so as to ensure the long-term sustainability of the interventions, further allowing for their adaptation and evolution as and when needed by the community. The element of solid waste and the required management is critical to the success of the operation of the green infrastructure, as currently the open drainage canals serves as both dumping grounds and windblown collection points for much of the solid waste. To effectively address this situation, there is a need to highlight the potential value in what is otherwise considered as waste - a need not only restricted to informal settlements. By realising the potential value in separating organic waste from general waste and the creation of a space to harness the value from the organic waste, the community will be able to realise the potential in upcycling to a viable economic resource. The process begins by allowing for self-organisation amongst the community and working to arrange for central locations for waste disposal that form part of their day-to-day routine. The current project focuses on organic waste, but opportunities for recyclable and other forms of waste are to be explored as the project develops. The development of marketable products in the form of nutrient rich compost or an upcycled commodity is to be supported by neighbouring communities within Franschhoek, creating a sustained market to support the small-scale economic enterprises. This project represents a transversal approach by the Western Cape Government with the following Departments involvement and financial support, Environmental Affairs and Development Planning, Economic Development and Human Settlements.

Source: DEADP: Directorate: Pollution and Chemicals Management, 2015

3.4.3 Towards a Green Economy

The NDP (2012) envisions a shift towards a Green Economy and emphasises that the country needs to transition to a low-carbon economy and society that fosters innovation in green product and service development. This is in line with province's vision in terms of the ecological transition from an unsustainable carbon-intensive resource use society to sustainable, low carbon resource use (OneCape 2040; WCG 2012). The OneCape 2040 indicates that goals based on the proposed changes involve ensuring that the Western Cape Province is recognised as the leader and innovator in the Green Economy.

The province is involved in the Green Economy to enable growth of the waste economy and to support local government and the private sector to improve the recovery of waste material and beneficial use thereof (Strategic Five Year Plan, 2014). A Green Economy Strategy Framework is in place to promote the concept by facilitating recycling within the province (SoEOR, 2013). The framework aims to optimise green economic opportunities without compromising environmental integrity and performance and consists of five key principles (GPS, 2014):

- Market focus: Green economic action needs to be based on market dynamics and strong potential market demand from the local to the global sphere.
- Private sector-driven: Investment to support green growth needs to be driven primarily by private enterprise and in particular by entrepreneurial businesses with the foresight and risk appetite for new economic endeavours.
- Public Sector-enabled: The principal value of public entities is to enable the green economy.

Through procurement, they can create an important market and in doing so, provide both political and economic leadership through the following:

- Collaboration: Innovation and market expansion require new forms of collaboration and partnering as greater uncertainty and complexity emerge in the economic, social and environmental nexus.
- Inclusion: Resource and climate change challenges threaten economic exclusion. Inclusion needs to be integral to growth.

One of the goals of the Western Cape is for research to support the Green Economy expansion within the province (Strategic Five Year Plan, 2014).The province is mandated to provide support to municipalities by creating an enabling environment to grow the Green Economy by facilitating increased economic opportunity through low-carbon development and resource efficiency (Strategic Five Year Plan 2014).

3.3.2.6 *Green Economy Strategy Framework*

The Western Cape Green Economy Strategy Framework (2013) has a vision to "position the Western Cape as the lowest carbon province in South Africa and the leading green economic hub of the African Continent". This aligns with the vision of the NDP.

Figure 11 indicates the 5 key"drivers" that are market focussed, supported by 5 "enablers" that are either the domain of the public sector or the product of a collaborative effort.

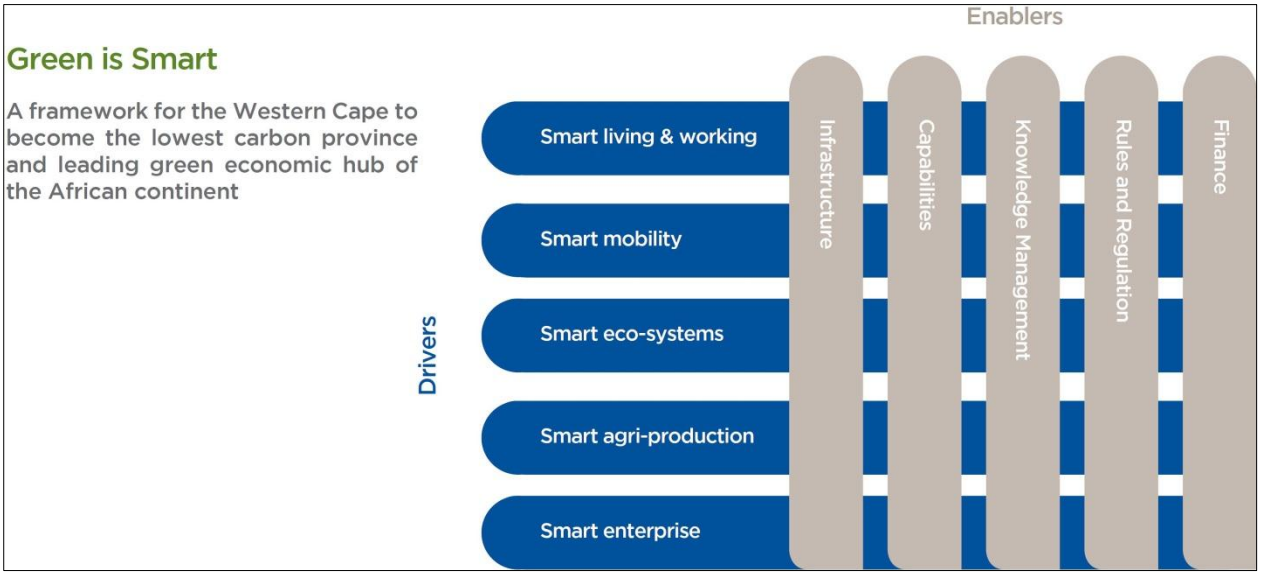


Figure 11: Western Cape Green Economy Strategy Framework (2013

Under the **"Smart Living and Working"** driver is the priority to "*create opportunities through less resource intensive living and working environments and consumptions patterns*". It recognises, amongst others, the challenge of limited resources and high waste volumes that go to landfill compared with less than 20% in best practice regions. Opportunities identified is a high quality craft and design sector with strong elements of recycling and up-cycling. An example is the beneficiation of agricultural waste (i.e. grape skins) into higher value products before use as waste-to-energy.

The Green Economy Strategy Framework (2013) aims to grow the commercial waste economy in partnership between public and private sectors as a major source of green jobs. To achieve this, innovation in identifying waste materials, enabling an environment to support the waste economy and develop a market by establishing a province-wide waste exchange to support the expansion and creation of new waste enterprises by improving the knowledge of waste resources[32].

[32] Already underway GreenCape's recent Western Cape Industrial Symbiosis Programme (WISP)

Box 4: Recycling

"Recycling in all its forms already employs 12 million people in three countries alone (Brazil, China and the United States). Sorting and processing recyclables sustains 10 times more jobs than landfilling or incineration on a per metric tonne basis".

(Source: UNEP, as cited in the Green Economy Strategy Framework, 2013)

Under the **"Smart Agri-production"** driver is the priority to *"livelihood and market opportunities created through enhancing the competitiveness and resilience of our agricultural and food economies"*. It recognises that agriculture and fishing are key economic sectors in the Western Cape with a critical challenge of resource intensity of farming practices and to become water efficient and energy efficient, low-carbon and resources intensity input technologies and practices.

The Green Economy Strategy Framework (2013) states that minimising waste is part of smart agriculture and manufacturing processes. There are opportunities on farms to convert vegetation mass into compost, biochar and biofuel which in turn will create new economic opportunities in machinery development, new technologies that will increase the efficiencies of the beneficiation proceses and new product markets. To achive this, high value opportunities in agricultural waste in addition to waste-to-energy projects needs to be identified. This can be done by linking the pricing of waste removal volumes of non-recycled waste generated and to create markets for new energy generated including public sector markets.

By initiating the above 2 drivers and enablers, as set out in the Green Economy Strategy Framework (2013), is already a first step in a journey to make the Western Cape the lowest carbon province in South Africa.

3.3.2.7 The Informal Sector

According to the PERO (2015), the informal sector in the province is quite small and is at 10.5% of the total employment. This is a worrying statistic as the Western Cape still has high unemployement levels and thus shows that the informal sector is not big enough to absorb the unemployed (PERO 2015). Research conducted by Smit (2015) identified a number of green activities taking place in the informal economy. These include waste recovery, recycling, reuse and composting. Growth of the informal sector is thus important as it contributes to the Green economy; helps eleviate enviromental impacts through the recovery, reuse or recycling of waste; and, helps reduce unemployment in the Western Cape. Further support to the informal sector is around skills development and the Department together with Department of Economic Development and Tourism are looking at ways to support this sector.

3.4.4 Integrated Waste Management Infrastructure

The Western Cape provincial vision regarding waste is to ensure the provision of a sustainable waste service (OneCape 2040 2012). The OneCape 2040 envisions that improvements in waste infrastructure and systems will reduce costs, environmental risk and also create new opportunities in integrated waste management. The province's management of waste is mainly disposal at landfills and incineration. This form of management is considered unsustainable as it leads to soil, water and air pollution if operated improperly (SoEOR 2013). The State of Environment Outlook Report (2013) (SoEOR) highlights the need for sustainable waste management practices to incorporate the hierarchical approach in the management of all waste streams. It also emphasises the need to explore all waste management alternatives before landfill disposal or incineration are considered.

The majority of waste management facilities within the province lack the infrastructure to quantify waste and in the smaller municipalities landfill operating equipment is either unavailable or inadequate (SoEOR 2013). Municipalities also lack integrated waste management infrastructure to recover and divert waste from landfill and this poses a great challenge for the province's Waste Economy vision (DEADP Strategic Plan 2015 - 2020). The DEADP Strategic Plan (2015 - 2020) emphasises the importance of investing in infrastructure and human resources in order to improve legislative compliance of waste management facilities. Municipalities do not have the required resources to deal with failing and aging infrastructure and underinvestment in the maintenance of infrastructure in the past has caused significant backlogs and deteriorating municipal infrastructure (DEADP Strategic Plan 2015-2020).The Western Cape Infrastructure Framework (WCIF 2013) indicates that the province is generally well served with infrastructure even though infrastructure provision and service delivery in rural areas still presents a challenge.

According to the WCIF (2013), one of the biggest challenges in the waste sector is the lack of information with regard to waste volumes and composition and this information is required for planning purposes and infrastructure interventions. The framework highlights that larger municipalities in urban areas struggle to source funds so they could achieve waste diversion targets as well as funds that will ensure landfill compliance as required in the Waste Act and NWMS. The WCIF (2013) emphasises that the inefficient recovery of costs through tariffs and small budget allocation to the waste management function results in a shortage of funds to provide adequate infrastructure or manage waste services effectively.

Reliance on grant funding alone will impede the achievement of waste diversion targets therefore municipalities need to conduct full cost accounting when setting tariffs. Phase 1 of the Waste Research, Development and Innovation (RDI) Roadmap (DST 2012) highlights the need for collaboration between the private and public sectors with respect to infrastructure and the introduction of new technological innovations. Phase 2 Waste RDI Roadmap (DST 2014), highlights the need for Support Systems Services with respect to infrastructure to create an enabling environment for infrastructure needs. It also emphasises the need for the development of a roadmap on how municipalities will achieve their objectives regarding infrastructure.

3.4.5 Regionalisation and Innovation of Waste Services

The NDP identifies the need for the development of regional facilities such as regional waste treatment facilities for the recovery of waste to energy. It recognises the need for the delivery of municipal services on an agency basis, where municipalities or districts lack capacity. The WCIF (2013) emphasises that regionalisation of waste facilities will depend on the transport economics against the availability of local waste sites and resources. It also highlights that increases in the use of rail for mass waste transport can have the dual advantage by reducing waste transport costs as well as road-pavement loads, particularly in the context of increased waste regionalisation. This can also play a significant role in the transportation of recovered waste material to the markets.

Rural municipalities struggle with basic waste collection and landfill management. Municipalities are investigating the feasibility of regionalisation, however, the costs associated with the transportation of waste for long distances is a barrier particularly since municipalities have an old waste fleet (WCIF 2013) and the cost of transport is ever increasing. The governance and financing of the regional facilities is complex due to the multi-party involvement. These regional facilities have to be operated by the district municipalities and unfortunately these municipalities do not receive any MIG Funding, which makes it difficult to construct and operate these facilities. However regionalisation of not just waste disposal facilities but integrated waste management has to be encouraged and alternative business cases such as private-public ventures have to be explored.

Phase 2 Waste RDI Roadmap (DST 2014) stresses that there will be a need for strong technical innovation in order to transition from traditional waste disposal methods by landfill to the sustainable implementation of the waste hierarchy. The Roadmap highlights that globally, government, business and academia are investing in alternative waste technologies and are recovering resources from waste in an efficient and effective manner (DST 2014).

According to the DST (2012) Roadmap, the introduction of waste innovations is hindered by various technological and non-technological aspects including the following:

- Legislative requirements;
- Lack of information on the waste sector;
- Lack of collaborative efforts;
- Economic and financial aspects;
- Institutional arrangements;
- Behaviour and perceptions; and
- Human capital development.

The DST Roadmap investigated the country's waste sector and highlights the adoption of innovation in the private sector and within municipalities where it looked at product as well as process innovations with respect to waste goods or services and waste processes respectively to determine any significant improvement in both the private and public sectors. The results of the Roadmap (DST 2012) show that innovation, in terms of technological adoption, is greater in the private waste sector (private: municipalities; 52%: 41% in terms of new product innovations) than in municipalities (56%: 35% in terms of new process innovations). In terms of non-technological adoption, there was a similar pattern with the public waste sector having lower organisational and marketing innovations to its operations when compared to the private waste sector. This further emphasises the need for partnerships between the private and public sectors as also indicated in aforementioned section. Municipalities need to be aware of new developments in the waste sector with respect to landfill operation and management, waste collection optimisation and waste minimisation, etc. as this enables them to explore innovative and in some cases cost effective ways of improving their service (CSIR 2011).

Some of the key issues preventing the establishment of regional waste management facilities, identified in the Greater Cape Metro Regional Spatial Implementation Framework – 2027 (Baseline Status Quo Report of December 2015), include:

- A lack of accurate waste data;
- A lack of integrated Waste Management By-laws;
- A lack of capital funds and increased cost of waste e.g. containment barriers;
- A lack of capacity in municipalities wrt integrated waste management;
- A lack of waste input material in order to develop alternative waste to energy technologies; and
- Limited access to recyclables and lack of markets for secondary goods.

The Back to Basics Programme (see 2.6.3.1) is described as targeting critical municipalities who were profiled as being either "just functional" or in "ICU". An important initiative that will be implemented through the Back to Basics Programme is shared services. Various models, introduced for municipalities to share services, include the following: Legal Services, Internal Audits, Planning, Risk Management and ICTs.

Regionalisation of waste management facilities and services will not only benefit and assist local municipalities to operate effectively and efficiently but will also provide impetus to the green economy in the Western Cape.

3.4.6 Recycling and a circular Western Cape economy[33]

The Provincial Economic Review and Outlook (2015) states that the aggregate recycling sector in the South African economy employs over 100 000 people. There are important indirect benefits such as reducing landfill airspace. The supply-chain itself can in some cases be a benefit, as waste can be collected at the point of consumption where products are delivered.

Taking this further would go towards creating a so called "circular economy" with closed material loops. In short, such a system designs out waste and reuses the durable parts of products that are not consumed. It is estimated that in terms of job creation potential, waste recycling can generate 4 500 jobs in the Western Cape province. There are several private sector Waste to Energy projects currently taking place in the Western Cape (PERO 2015). These are:

- Small to medium scale biogas plants;
- Landfill gas to electricity;
- Small scale pyrolysis plants generating biodiesel;
- Biodiesel from waste oils; and
- Fuel replacement in industrial boilers using biomass.

On a municipal basis, various projects have also been identified. However, becoming a true circular economy is a very long-term process and requires committed participation of every individual actor in the economy (PERO 2015).

[33] Barry (2015); Lochner (2014); Institute of Futures Research & Van de Rheede (2014), as cited in the Provincial Economic Review and Outlook (2015)

3.5 Summary of Chapter 3

This Chapter provided a synopsis of the problem of waste in South Africa and in the Western Cape. It explained the linkages between national and provincial planning areas relating to integrated sustainable waste management in the Western Cape. It explained the drivers of change to enable a resilient, inclusive living and low carbon province in South Africa and leading green economic hub of the African continent.

Waste management is an element of environmental order marking which is one of the areas of sustainable development. Sustainable development finds its place in urban areas whose development depends on environmental and natural circumstances. The notion of sustainable development necessitates the functioning of urban cities to protect urban communities and the environment (Mesjasz-Lech 2014). Therefore, waste management, as discussed in earlier sections, should be seen in the context of sustainable development.

What follows, is an update of the Department's initiatives to enable Integrated Waste Management and the current state of waste management, provided per district, in the Western Cape.

4 CHAPTER 4: WASTE MANAGEMENT IN THE WESTERN CAPE

4.1 Introduction

This Chapter provides an overview of the Department's mandate in terms of its **supervision**, **monitoring** and **support** function of local government as set out in Sections 41, 139 and 154 of the Constitution. It further discusses current waste management practices, per District, in the Western Cape province.

4.2 Role of DEADP

The Department develops and implements waste management legislation, policies, norms, standards and guidelines and regulation of waste management facilities. Support is provided to communities, municipalities, industry and the private sector through the implementation of project-directed measures and initiatives. The main purpose is to improve integrated waste management in the Western Cape province as one of the tools to position the province as the lowest carbon province in South Africa, and the leading green economic hub of the African continent. The dedicated WMO for the Western Cape is the Director: Waste Management, Mr Eddie Hanekom.

The Waste Management team also supports the following initiatives to enable Integrated Waste Management:

- Integrated waste management planning: Working with municipalities and industry to improve how waste is managed in the Western Cape;
- Regulating waste management facilities: Technical assistance to municipalities is provided with the aim to improve the construction, management and operation of waste management facilities in the Western Cape; and
- Waste policy and minimisation: Recovery of waste material and stimulation of the waste economy, job creation and policy development;.

Waste Management falls within the Environmental Quality Chief Directorate of the Department. The organigram of the Waste Management Directorate with its 3 sub-directorates, performing various functions, is as follows:

Figure 12: Waste Management Directorate Organigram

At strategic planning sessions held in 2014, the Department aligned its goals and objectives to the draft Provincial Strategic Plan (2014 – 2019). Various programmes have been developed to promote sustainability and being more efficient in the use of resources. Programme 4 "Environmental Quality Management", under which Waste Management falls, has the following purpose:

"Establish legislation, policies, norms, standards and guidelines for environmental impact management, air quality management and management of waste and pollution at provincial and local spheres of government"

Project-directed measures for Environmental Quality consists of 3 sub-programmes one of which is "sub-programme 4.3: Pollution and Waste Management".The purpose of "sub-programme 4.3: Pollution and Waste Management" is to:

- Develop and implement waste management plans and hazardous waste management plans and support local government to render the appropriate waste management services;
- Carry out effective authorisation of solid waste disposal sites and other waste management authorisations as required in legislation; and
- Develop waste information systems to improve implementation of programmes to reduce and recycle waste.

Sub-programme 4.3 has 2 objective statements (Table 7), related to waste management, with indicators and targets.

Table 7: Sustainable waste management programmes and projects

Objective statements	Projects
To facilitate integrated waste management and resource efficiency	Waste minimisation intervention(s) undertaken for priority waste streams
To facilitate integrated waste planning and management	Review of Western Cape 1st Generation IWMP Percentage of waste licence applications finalised within legislated timeframes Hazardous waste intervention(s) undertaken Municipal integrated waste management infrastructure report Waste management planning interventions undertaken Annual state of waste management report

The projects listed in Table 7 will be discussed in detail under the various sub-directorate projects.

4.2.1 Waste Management Planning Sub-directorate

The Waste Management Planning Sub-directorate is responsible for the following:

- Quality assure and provide comments on tehnical reports, policies, legislation, standards and guidelines;
- Quality assure and provide comments on Basic Assessment Reports, Scoping & Environmental Impact Assessment Reports;
- Compliance promotion, monitoring and enforcement investigations with respect to statutory obligations;
- Assistance and support to Industry (Consumer Formulated Chemical Sector and Construction and Demolition sectors) through development of a Hazardous Waste Intervention, assessing Industry Waste Management Plans and establish the Industry Waste Management Forum;
    - So far in 2015 the Sub-directorate: Waste Management Planning has received and assessed Industry Waste Management Plans for 5 companies.
- Provide assistance and support with respect to Integrated Waste Management Planning to municipalities including conducting waste characterisation training and assessing municipal Integrated Waste Management Plans.

Projects in Table 7 for this financial year (2015/2016) is as follows:

- Review of 1st Generation Western Cape IWMP;
- Hazardous waste intervention(s) undertaken;
- Waste management planning interventions undertaken;
- Annual state of waste management report.

Other projects includes:

4.2.1.1 Waste characterisation surveys

The overall vision of the NWMS is to reduce the generation and environmental impacts of all forms of waste. The Constitution provides for provincial governments to support local municipalities in matters relating to waste management. In support of this provision the Department conducted waste characterisation surveys in 2007 at selected waste disposal facilities within the Western Cape province. The surveys were intended to:

- Stimulate job creation and skills transfer;
- Improve the quantity of information on the various waste streams that are generated within municipalities;
- Establish the potential monetary value of different waste streams and their recycling potential;
- Determine the calorific value of the waste streams to establish their potential for energy recovery; and
- Improve waste management planning at all spheres of government.[34]

Subsequent to the 2007 study, the Department conducted more surveys in Beaufort West, Laingsburg, Prince Albert, Kannaland, Swellendam, Cederberg and Matzikama municipalities. Furthermore, the Waste Management Planning Sub-directorate is currently assisting the Eden District Municipality to conduct waste characterisation surveys in the District. Training and hands-on assistance was provided to municipal officials from various municipalities during the survey conducted in Bitou. The sub-directorate will also provide waste characterisation training to Cape Winelands and will conduct a waste characterisation survey in Elim, located in Overberg District.

[34] Chetty, K., et al. "Waste Characterisation: Mapping the Economic Potential of Waste" (Paper presented at the 19th Waste Management Conference of the IWMSA, October 2008)

4.2.1.2 Integrated Pollutant and Waste Information System

The Integrated Pollutant and Waste Information System (IPWIS) was established in 2002 to provide accurate information on potentially harmful pollutant releases or transfers to the environment from a variety of sources, waste types, quantities of waste generated and waste management facilities (waste disposal facilities, refuse transfer stations, drop-off facilities, recycling facilities, etc.) in the Western Cape.

The Department has an exemption for waste management facilities within the Western Cape to submit their waste information to the South African Waste Information System (SAWIS) and the provincial waste information system. IPWIS is fully operational and collects and submits the minimum required information to SAWIS as set out in section 60(1) of the Waste Act.

The registration and reporting of waste information to IPWIS is mandated by the National Environmental Management: Waste Act (59/2008): National Waste Information Regulations promulgated on the 13 August 2012 and the Provincial Health Care Risk Waste Management Regulations promulgated on 15 March 2013 (HCRW regulations).

HCRW stakeholders have since registered and are reporting on waste quantities to the Eden District Municipality's Collaborator system, in terms of Section 27 of the Municipal Health Services By-Laws PG 6566 17, dated 17 October 2008. It is a legislative requirement for HCRW stakeholders to ensure that they are registered and reporting on their waste quantities to IPWIS, in terms of the HCRW regulations. Once stakeholders have registered on IPWIS, they will receive an IPWIS Registration Certificate with a Waste Information Registration number.

4.2.2 Waste Policy and Minimisation Sub-directorate

The Waste Policy and Minimisation Sub-directorate are involved in various awareness raising and education initiatives.

Projects in Table 7 for this financial year (2015/2016) are as follows:

- Develop waste minimisation instruments for 2 priority waste streams.
- Implementation of waste minimisation support for hospitals which includes advice on infrastructure, signage and awareness. The sub-directorate has assisted the Somerset Hospital and are supporting Lentegeur Hospital with challenging waste management issues. A checklist for setting up recycling in hospitals has also been developed.
- Develop a waste minimisation brochure that will provide hospitals with a guide on how to establish a waste minimisation programme designed specifically to their needs. Details on specific procurement needs, collector/recycler selection and recycling ideas linked to the respective wards will also be provided.

4.2.2.1 2Wise2Waste (2W2W)

The 2W2W programme aims to drive and mainstream resource efficiency and sustainability through waste minimisation and recovery of waste material. This supports long-term cost savings and carbon emissions reduction for the Western Cape Government (WCG). The desired objective is to mainstream the programme in the WCG by creating awareness and effecting behavioural change amongst WCG employees in all provincial buildings in the Western Cape. The programme was also adopted by some municipalities with the support of the Department. The Waste Management Directorate drives the waste management part of 2W2W.

The waste aspects of the programme deliverables for this year include the following:

- Development of a waste minimisation brochure for hospitals;
- The waste minimisation project team offers ongoing support to all Departments who have implemented recycling programmes. The Sub-directorate also play an advisory role for the Department of Public Works who are responsible for the transversal recycling programme in WCG buildings;
- 2W2W waste minimisation training is offered to officials and to cleaning staff in all WCG buildings as the need arises.

4.2.2.2 *Waste Minimisation Training - Environmental Protection and Infrastructure Programme (EPIP)*

The EPIP programme is a youth jobs in waste employment initiative driven by DEA. The project was rolled out to 24 local municipalities in the Western Cape with TEDCOR employed as the project implementer. The programme created temporary employment for approximately 20 youth per Municipality to assist waste managers in the following areas:

- Landfill site operations and waste collection administration;
- Environmental education & awareness campaigns; and
- General duties.

The Department provided waste minimisation training to these youth and the following workshops were conducted in the Western Cape. Waste Minimisation Training Workshops conducted are depicted in Table 8

Table 8: Waste Minimisation 2015 Training Workshop

Municipality	Town	Date
West Coast District	Citrusdal	16 February 2015
	Eendekuil	22 May 2015
Overberg District	Hermanus	4 June 2015
Central Karoo District	Laingsburg	11 June 2015
Cape Winelands District	Worcester	25 June 2015
	Stellenbosch	26 June 2015

4.2.2.3 *Waste Minimisation Training for Municipalities*

The Sub-directorate has developed a waste minimisation guideline and training programme for municipal staff. Training was provided to workers in the Breede Valley Municipality on 23 July 2015.

Figure 13: Waste minimisation training conducted in Eendekuil

4.2.2.4 Recycling Economy

The Provincial Strategy to stimulate the Recycling Economy stems from a drive to promote the Environmental Economy in the Western Cape. At the same time, the strategy also aims to give effect to the NWMS and Waste Act which aims to minimise the generation of waste and promote waste recycling. Most waste disposal facilities are nearing closure and waste minimisation, including recycling initiatives, are critical to prolonging their lifespan.

The strategy focuses on securing the supply of recyclables while stimulating the market for recycled products. One of the provincial objectives is to create opportunities to start recycling by facilitating processes between industry, municipal officials and communities. Another key focus area of the strategy was to stimulate the market for products made from recycled material by developing and implementing a "Buy Recycled" marketing campaign .

A Waste Minimisation Summit was hosted by the department in 2010 and contributed to the development of the Western Cape Recycling Action Group (WCRAG). The WCRAG comprises of representation from recycling industry bodies, research bodies, NGOs, SMMEs, municipalities and relevant provincial government departments who meet quarterly to address issues pertaining to recycling and participate in joint initiatives that support the recycling economy in the Western Cape.

Industry partners who are active members of the WCRAG and contribute to the WCRAG's Municipal Support programme are:

- CONSOL
- Sappi
- Nampak
- Collect a Can
- Glass Recycling Company
- E-waste Alliance/SAEWA
- Bevcan
- Mpak
- PRASA
- Mondi

Table 9 depicts various collaborative initiatives for the years 2012 to 2015.

Table 9: Collaborative initiatives: 2012 - 2015

Municipal Support	Provincial Waste Material Flow	National Recycling Day	Value Adding Recycling Workshop
Cederberg: Ongoing meetings to be held with the Municipality as recycling is happening, but formalisation is needed. **Bergriver:** Industry provided infrastructure for a recycler in Public Private Partnership with Municipality. **Cape Agulhas**: Site visit conducted to determine status of waste management facilities and waste minimisation. Recycling is taking place, but no record keeping is being conducted. DEADP will assist with the data collection process where possible.	Waste flow exercise undertaken in the province to establish where recyclables are being recovered and where their markets are. This will assist the Department in identifying the gaps and opportunities for further development in the sector. Survey has proved difficult in obtaining information from Industry and municipalities to develop a comprehensive database.	**20 September 2013** at Cape Town Station forecourt. Recycling industries partnered with WCRAG under guidance of DEADP. **19 September 2014** at Citrusdal Primary School Linkages with National Recycling Forum: Plastics South Africa" Clean up and Recycle" campaign Five schools in Cederberg had their own National Recycling Day Programme. Their campaign was to clean up the neighbourhood and to produce crafts from the material collected. **18 September 2015** Planning awareness and support for swop shops campaign	**3 December 2013** at Laingsburg EPWP workers in Laingsburg Municipality trained Introductions to Waste Management and Recycling, Health and Safety, identification of recyclable material, Vermiculture and the use of recyclable products for crafting such as candle holders, tin can lamps and Christmas tree decorations

Figure 14: Selection of photos showing National Environmental Day 2014 in Citrusdal

4.2.2.5 *Stakeholder Engagement on Status Quo of Food Waste in the Western Cape*

Globally it is estimated that between 30 – 50% of food produced is wasted before reaching consumers.

Similarly, South Africa faces the dilemma of food being wasted throughout the food value chain process i.e. production, processing, handling, storage, transportation and distribution of food before reaching consumers. However, most of the research in this field is based on inferences made from the data of Sub–Saharan African statistics and not necessarily on accurate quantification of food waste in South Africa. Secondly, the statistics does provide detailed information per province. This equates to 9 – 10 million tonnes of food being discarded, causing a negative effect on food security, wastage of resources used in food production and distribution and cause of environmental impacts specifically at our waste disposal facilities. The loss of food throughout the food value chain and the disposal of food waste at waste disposal facilities therefore needs to be addressed.

A study will therefore be undertaken to determine the status quo of problematic food waste within the Western Cape. Research will be conducted on the current management of food waste with reference to pre- and post-consumer, best practice methods with reference to international and local studies, current measures in place to minimise food waste, where possible to quantify the amount of food waste that ends up at disposal facilities and provide alternative solutions to ensuring that food waste is minimised before it is landfilled.

The aim of this project is to minimise food waste going to landfill in the Western Cape by understanding the nature of food waste management so that effective strategies and action plans can be developed to address the problem.

To date:

- Extensive research conducted on food waste in South Africa and Western Cape;
- Engagements with various stakeholders as part of the research process.

Going forward:

- Draft a Status Quo Report on a problematic food waste stream i.e. abbattoir waste in the Western Cape;
- Host two stakeholder engagements; and
- Develop a guideline for managing waste from the meat industry.

4.2.2.6 *Waste Management in Education (WAME)*

The WAME programme was initiated with the objective of creating waste awareness in the classroom and ensuring that Integrated Waste Management was mainstreamed in the curriculum of schools in the Western Cape. This award winning programme was developed into an effective tool for engaging with communities and schools on Waste Management and other environmental issues. The Department partners with respective municipalities and the Department of Education in rolling out the programme to various schools. Training workshops are conducted with educators who are also provided with educational resources to implement the programme in the classroom. The envisaged outputs of the WAME programme are to see changes in behaviour around littering, illegal dumping and waste minimisation at schools and communities. The Department has developed an electronic tool to assist the Department of Education in rolling out the WAME programme to educators in the province. It is envisaged that this tool will be further developed as an online training module which educators can access online.

4.2.2.7 *Draft Model By-law*

A study conducted by the Council for Scientific and Industrial Research (CSIR) on behalf of the Department of Science and Technology (DST, 2013), showed that legislation is the second most cited constraint, by both the public and private waste sectors, to waste innovation in South Africa.

The Department of Economic Development and Tourism in the Western Cape conducted a Regulatory Impact Assessment (RIA) study for the Waste Economy in the Western Cape which identified municipal waste By-laws as restrictive to economic growth. Subsequently, the Department is in the process of developing a model By-law for municipalities to firstly ensure that regulatory requirements for waste management do not hamper economic development and secondly, that it is aligned with current national waste legislation.

The project aims to ensure that all waste related By-laws in the Western Cape are aligned to national legislation and that they impact positively on the growth of the waste economy, and in so doing, create an enabling environment for stimulating public and private waste sector growth and job creation.

The project further addresses the issue of standardisation of terminology and definitions in By-laws to facilitate better regional agreements between two or more municipalities.

The scope of the project involves the drafting of a model By-law and an explanatory manual for municipalities and interested and affected parties.

To date:

- All by-laws have been reviewed to establish alignment with national legislation;
- A reference group has been established;
- A detailed status quo on the alignment of Western Cape By-laws to national legislation and to both national and provincial priorities was conducted. The status quo reflected the following:
    - 1 of the 5 district municipalities has a waste related By-law;
    - 20 of 24 local municipalities have waste By-laws including the Cape Metro;
    - 9 by-laws were published after 2010 but only 6 were reasonably aligned to the NEMWA;
    - A number of definitions in the by-laws are not aligned to the NEM: WA;
    - Definitions use outdated terminology and also vary dramatically from each other;
    - Do not adequately allow for the management and recovery of waste as a resource.

Key deliverables:

- Draft model by-law;
- Vetting of draft model by-law;
- Explanatory manual on the draft model by-law;
- 2 stakeholder workshops.

Progress to date:

- A review of all waste related By-laws of Western Cape municipalities was conducted;
- The first draft of a Model By-law for Western Cape municipalities was work-shopped with waste managers and other stakeholders for comments;
- Comments are being considered as part of the drafting process;
- A second draft will be sent to the reference group for final comment;
- Final comments will be considered before the Draft model By-law is sent to legal services for vetting;
- Drafting of an explanatory manual will be developed and will accompany the Model By-law;
- The final Model by-law and the explanatory manual will be sent for Senior Management Service approva;
- Present final Model By-law to all stakeholders (industry, municipalities, etc.).

4.2.3 Waste Management Licencing Sub-directorate

The Sub-directorate Waste Management Licensing consists of waste regulatory services and waste licensing specialised services. Collectively, these two units are responsible for the following functions:

4.2.3.1 Licensing of waste management facilities

Chapter 5 of the National Environmental Management: Waste Act (Act No. 59 of 2008), as amended, makes provision for the licensing authority to issue a person requiring an environmental authorisation in the form of a waste licence with such licence upon the lodging of an application. The licensing process is governed by the National Environmental Management Act, 1998 (Act no. 107 of 1998), as amended, Environmental Impact Assessment Regulations, 2014 (Government Notice (GN) No. R. 982 of 4 December 2014). Activities that require a waste license are listed in terms of National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (GN No. R. 921) List of waste management activities that have, or are likely to have, a detrimental effect on the environment of 29 November 2013. Approximately 180 waste management licences have been issued since the establishment of the sub-directorate in 2009.

4.2.3.2 Compliance audits of waste management facilities

Licenced waste management facilities are audited against the conditions of their authorisations. Each auditable licence condition is assigned a compliance score, with the following acronyms and scoring used:

Acronym	Description	Compliance Score
NC	Non-compliant	0
PC	Partially compliant	1
C	Compliant	2

An average compliance score is then determined from which the overall compliance percentage is determined. This is typically summarised as in the following example:

Total	Status Indicator		Action
85 – 100 %	**Green**	**X**	**Small changes needed**
65 – 84 %	**Amber**		**Improvements required**
0 – 64 %	**Red**		**Major improvements required**

A plan of action addressing the areas of non-compliance is requested from the permit holder. The majority of compliance audits are conducted at waste disposal facilities in the Western Cape, with a quarterly target of 20 facilities for 2015/16 financial year.

4.2.3.3 Enquiries

Waste enquiries are handled by the unit. These enquiries typically consist of queries regarding the waste listed activities and licensing processes as described above.

4.2.3.4 Complaints

Members of the public frequently report on the illegal disposal of waste to land, or the mismanagement of both unlicensed and licenced waste management facilities. An assigned case officer then investigates the complaint, and compiles a report with a request of an action plan addressed to the transgressor. When legal intervention is required the Directorate: Environmental Compliance and Enforcement is consulted.

4.2.3.5 Landfill gas monitoring

Landfill gas, which amongst others includes hydrogen sulphide, carbon dioxide, oxygen and specifically methane is measured at operational WDFs.

Methane (CH_4) is a colourless, odourless asphyxiant, flammable, non-toxic gas that is lighter than air with a vapour density of 0.6. CH_4 is explosive between the concentrations of 5% - 15% by volume in air as per the Department of Water Affairs, Minimum Requirements for Waste Disposal by Landfill Second Edition, 1998. This concentration range is referred to as the explosive range with the two extremes being referred to as the lower (LEL) and upper (UEL) explosive limits respectively.

CH_4 levels at waste disposal facilities are determined by selecting measuring points in and around the waste body for the measurement of methane gas concentration. The measuring points are determined by establishing where older waste was disposed of, particularly in areas where the decomposition of the solid waste has already begun.

The results of the landfill gas monitoring exercise are written up as a Landfill Gas Report, and the findings communicated to the relevant Municipality.

Baseline data is captured to establish seasonal gas changes and to ensure that the safety on site is maintained should there be any exceedences of the gas threshold levels. Futhermore should the methane need to be managed, appropriate measures can be put in place by the muncipality.

4.2.3.6 *Assessment of Integrated Municipal Waste Infrastructure*

The Department has monitored and audited waste facilities within all the municipalities in the Western Cape since 2007. The audits revealed many shortcomings. The most recent departmental audits revealed similar shortcomings.

All 30 municipalities within the Western Cape have submitted first generation Integrated Waste Management Plans (IWMPs) and the majority of municipalities have developed and submitted second generation IWMPs.

These plans, however, fail to address the Municipal Integrated Waste Management Infrastructure (MIWMI) needs and do not quantify the financial resources required to comply with environmental authorisations.

Municipalities lack information on infrastructure needs and financial resources that would assist with the efficient and effective planning of their waste management infrastructure and ensure complaince with environmental authorisation conditions.

A service provider was appointed by the DEADP to conduct the aforementioned assessment. The assessment will quantify the integrated infrastructure needs and the investment needed to establish the infrastructure and quantify the cost of compliance. It will also identify synergies and efficiencies within the municipal waste management system.

4.3 Summary of this Section

This Section provided the Department's mandate in terms of the Constitution. It listed projects identified under sub-programme 4.3: Pollution and Waste Management and core functions of the 3 sub-directorates in the Waste Management Directorate.

Understanding demographic profiles over time provides an indication of the demand in waste service delivery due to growing waste quantities (and its complexity) as a result of economic growth and population growth as people move into urban cities and become more affluent. The next section provides an update of the current state of waste management practices per District Municipality in the Western Cape province. It explains the demographics, waste generation quantities and composition, the various waste management facilities handling and processing waste across the province and current sustainable integrated waste management practices.

4.4 CAPE WINELANDS DISTRICT MUNICIPALITY

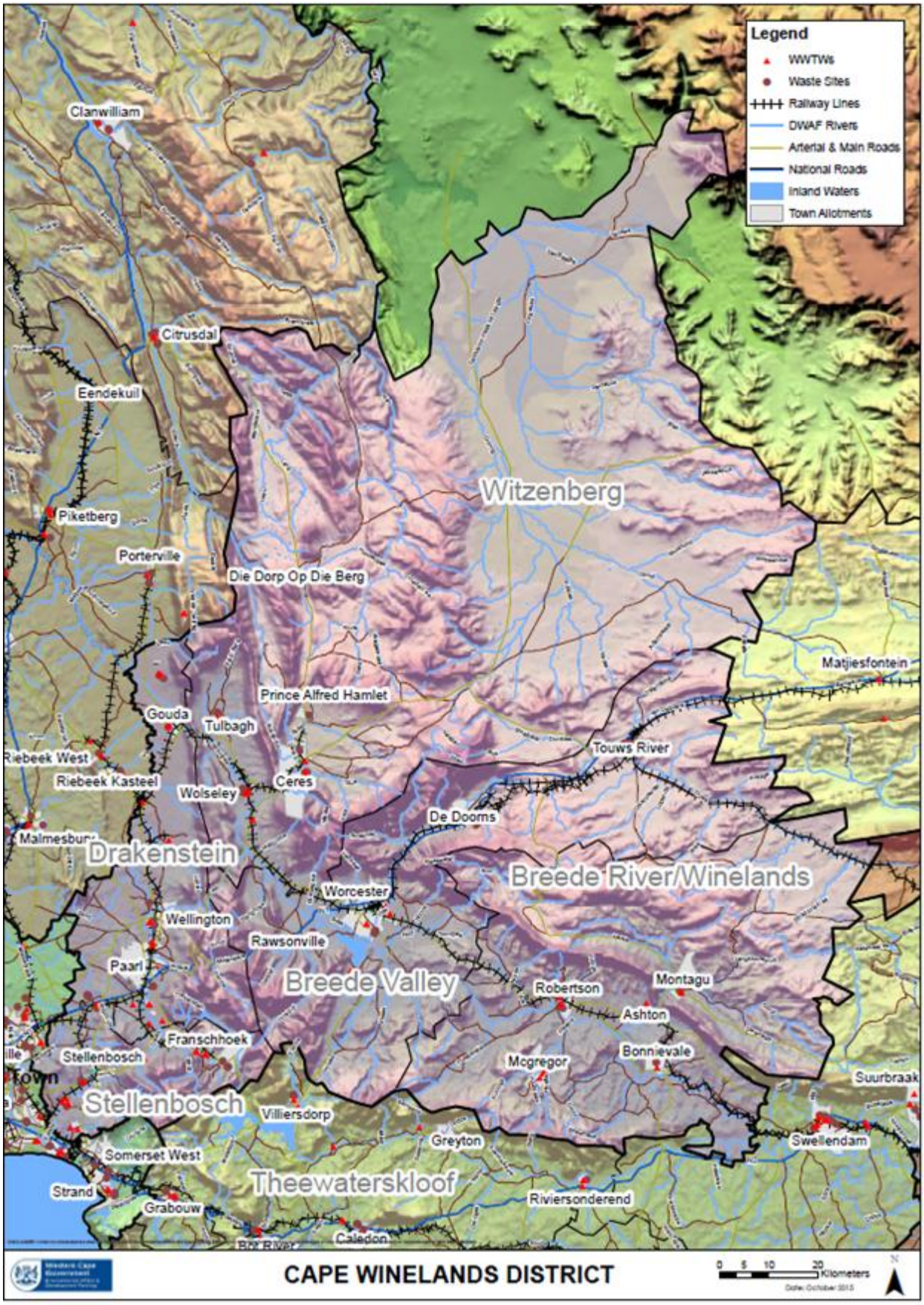


Figure 15: Geographical area of Cape Winelands District Municipality

4.4.1 Geographical Area

The Cape Winelands District Municipality (CWDM), a category C municipality, is situated in the Boland region of the Western Cape and covers an area of approximately 22,289km^2. The district is situated adjacent to the City of Cape Town metropolitan area and landlocked between the West Coast and Overberg District. The district is divided into five local municipalites: Witzenberg (B3), Drakenstein (B1), Stellenbosch (B1), Breede Valley (B2) and Langeberg (B3).

The District has a mediterranean climate with hot and dry summers and cold to moderate, wet winters. The Cape Winelands mountain ranges are the most significant features of the region. The mountains together with important rivers form the spines of the rich valleys that provide much of the wealth of the Cape Winelands economy.

4.4.2 Demographics

This section provides the socio-economic characteristics of the population within the CWDM based on statistical data for factors such as population, economic status, level of education, income level and employment status. Where no waste quantities are available, population and socio-economic status data can be used to estimate current and future waste quantities generated within the District.

4.4.2.1 Curent population and growth estimates

Table 10 depicts the population growth in the CWDM and serves as an indication of demand for service delivery provision, which includes integrated waste management services.

Table 10: Population growth (2001 – 2011)

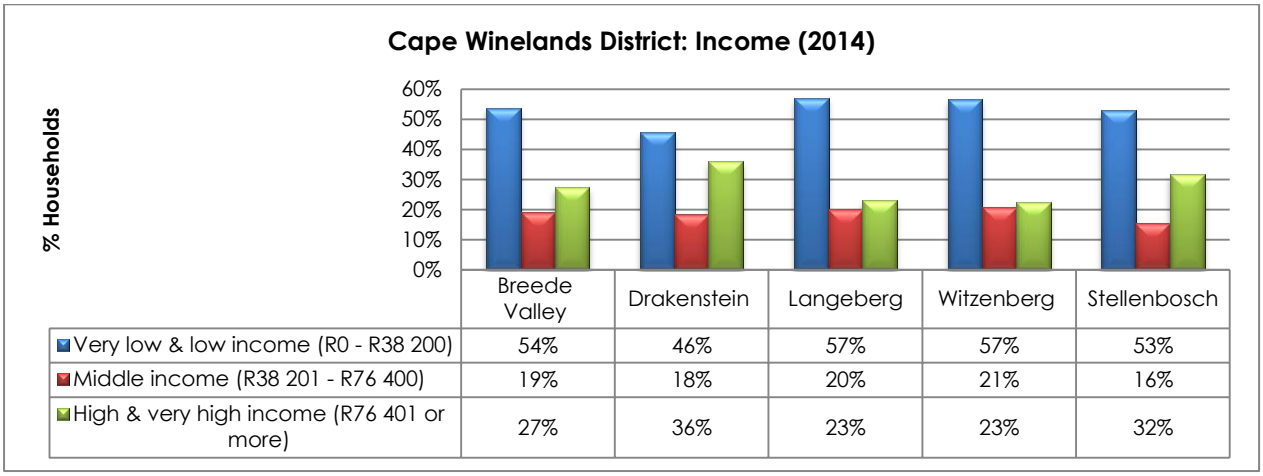
Municipality	2001	2011	Average annual growth (%)
Witzenberg	83,570	115,946	3.3
Drakenstein	194,416	251,262	2.6
Stellenbosch	117,715	155,733	2.8
Breede Valley	146,034	166,825	1.3
Langeberg	81,274	97,724	1.9
Cape Winelands	**623,009**	**787,490**	**2.4**

(Source: STATS SA)

The District has grown at a rate of approximately 2.4% between 2001 – 2011. The Witzenberg Municipality experienced the highest growth (3.3%) with Langeberg and Breede Valley Municipalities the lowest growth rates of 1.9% and 1.3% respectively. Population growth in the CWDM implies an increase in waste generation between 2001 and 2011.

4.4.2.2 Household income levels

Figure 16 depicts the various income levels within the CWDM for 2014.



	Breede Valley	Drakenstein	Langeberg	Witzenberg	Stellenbosch
Very low & low income (R0 - R38 200)	54%	46%	57%	57%	53%
Middle income (R38 201 - R76 400)	19%	18%	20%	21%	16%
High & very high income (R76 401 or more)	27%	36%	23%	23%	32%

Figure 16: Household income levels, 2014 (Source: Provincial Treasury, 2014)

The majority of the households fall within the very low and low income group (R0 – R38 200). The Drakenstein Municipality has the highest number of households within the high and very high income group (36%) compare to the rest of the municipalities.

4.4.2.3 Employment

Figure 17 depicts the distribution of skill levels[35] in the CWDM for 2013. The employment status of the CWDM indicates that the majority of employed people fall within the semi- and unskilled formal employment category (94 465) and only 28 920 people fall within the highly skilled formal employment category. The disparity between demand and supply for labour skills is indicated in the MERO studies and the MERO (2014) specifically highlights the oversupply of the semi- and unskilled employment category as indicated in Figure 17.

[35] Highly skilled occupations include managers, professionals and technicians, semi-and unskilled labour include domestic workers and other elementary workers and skilled all other occupations, e.g. clerks, sales & services, skilled agricultural workers, crafts, machine operators, etc. (StatsSA Labour Force Survey, LFS and QLFS).

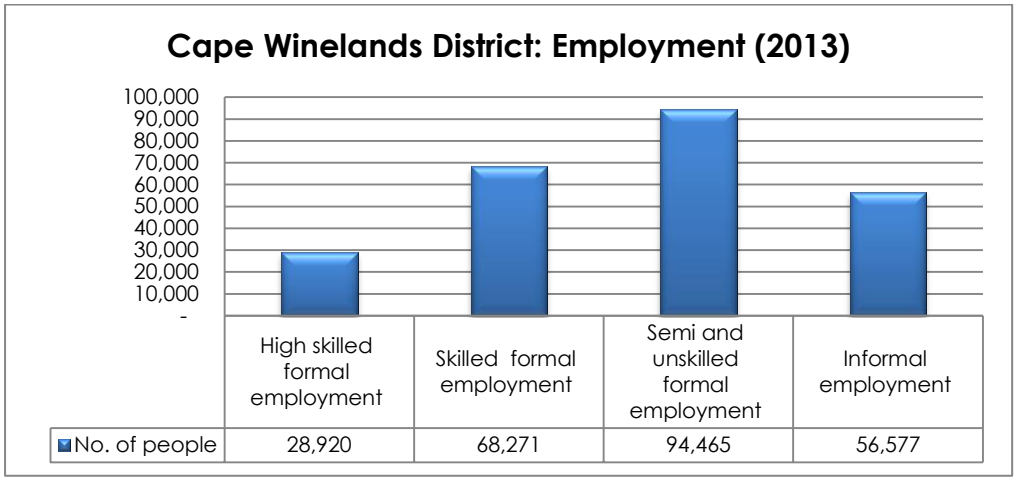


Figure 17: Employment 2013 (Source: MERO, 2014)

4.4.2.4 Level of education

The level of education is considered an indicator of the potential for employability, although this will be influenced by employment opportunities available within the District based on growth and development potential in the area. The Regional Development Profile documents (WCG: Provincial Treasury, 2012) emphasise the importance of education in improving access to employment opportunities and in sustaining as well as accelerating economic growth. Figure 18 depicts the level of education in the CWDM for the years 2001 and 2011 (Census, 2011). A great number of people within the CWDM have received secondary schooling and passed Matric/Grade 12 with fewer people that have received higher education.

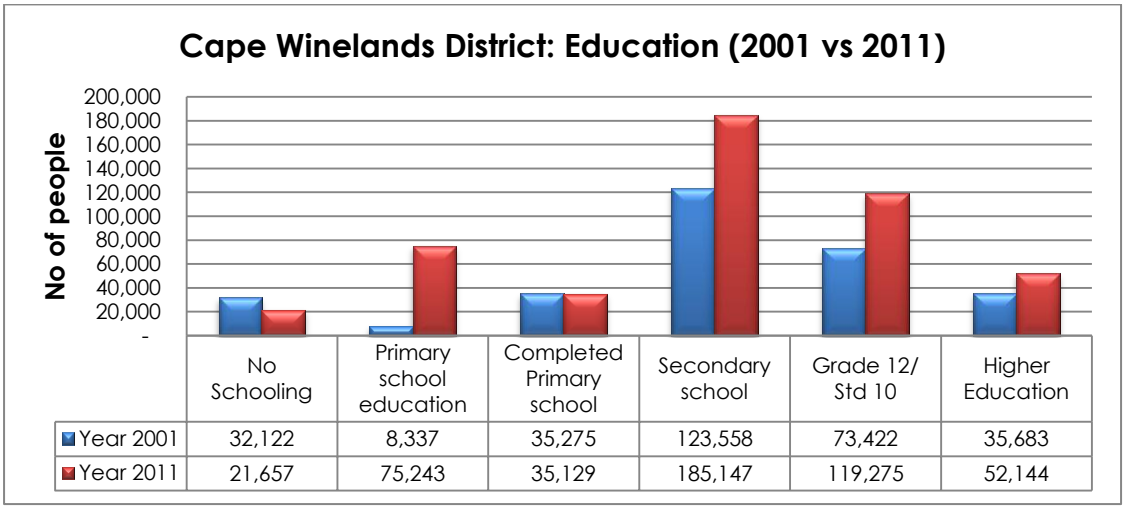


Figure 18: Education (2001 vs 2011)

4.4.2.5 Economic status

Figure 19 provides the real economic growth rate (percentage real GDPR growth) of the main sectors for the CWDM. The tertiary sector dominates in the District contributing to 62% of the GDPR. Dominant sectors are Business Services (14.1%), Transport Equipment, Wholesale & Retail Trade (12.8%), and Agriculture, Forestry and Fishing at 11.5%. This provides an indication of the types of waste being generated within the District.

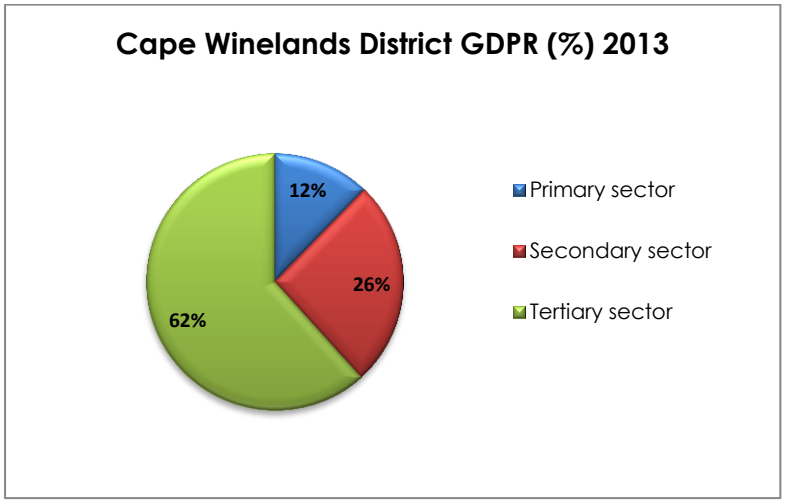


Figure 19: Sectors contributing to GDPR (MERO, 2014)

The detailed sector contributions to the Cape Winelands GDPR are shown below.

Primary Sector	Agriculture, Forestry & Fishing (11.5%), Mining & Quarrying (0.2%), Water (0.6%)
Secondary Sector	Food, Beverages & Tobacco (14.5%); Textiles, Clothing& Leather Goods (0.7%); Wood, Paper, Publishing& Printing (1.1%); Petroleum Products, Chemicals, Rubber, & Plastic (2.3%);other Non-Metal Mineral Products (0.6%); Metals, Metal Products, Machinery & Equipment (1.7%); Electrical Machinery & Apparatus (0.3%);Radio,TV, Instruments, Watches & Clocks (0.1%); Furniture &other Manufacturing (0.9%); Electricity (0.4%); Construction (3.5%)
Tertiary Sector	Transport Equipment, Wholesale & Retail Trade (12.8%); Catering and Accommodation Services (1.6%); Transport & Storage (5.0%); Communication (1.9%); Finance & Insurance (9.5%); Business Services (14.1%); Community, Social & Personal Services (5.8%); General Government (10.5%)

4.4.2.6 Transport Infrastructure

The road network in the District is largely rural with major road infrastructure in the east-west N1, the north-south R44 and R46. Refer to Figure 15.

4.4.2.6.1 Breede Valley

The road network is rural and the major roads are the southwest-northeast N1, the northwest, southeast R60 and the north-south R43 which link the towns within the municipal boundary All municipal waste and recyclables are transported by road (3rd generation IWMP 2015), and hauled on the N1 from Touwsriver to the Worcester WDF. Waste and recyclables will soon be hauled from De Doorns on the N1 to Worcester WDF. Waste from the Worcester area is not hauled to the WDF. Compactors are making use of the Villiersdorp road to transport waste to the Worcester WDF.

4.4.2.6.2 Drakenstein

The road network is rural and the major road is the north-south R44 which links all the towns within the municipal boundaries. Waste is only transported by road but there are railway lines that connect the towns of Paarl, Wellington, Hermon and Gouda excluding Saron, which can potentially be used to transport waste (3rd generation IWMP 2014). Recyclables are transported to the MRF in Distillery street, Huguenot, Paarl via the R301 and R44. All other waste is transported to the Wellington WDF and the following routes are used –

- Paarl North and surrounding farms to Interpace, Wellington via the R44,
- Paardeberg area via the R45,
- Paarl to Wellington via the R301, and
- Hermon, Gouda and Saron use the R44 route also known as the Hermon road.

4.4.2.6.3 Langeberg

The road network is rural and the major road is east-west R60 which connects Worcester to Robertson, Ashton and Montagu. This road serves as the main link between towns within the municipal area(2nd generation IWMP 2011).

4.4.2.6.4 Stellenbosch

The Municipality has a Comprehensive Integrated Transport Plan (CITP) in place for the 2012 – 2017 five-year period. The CITP is aimed at promoting sustainable infrastructure services and a transport system that fosters social and economic development. Projects including the maintenance, rehabilitation, renovations and construction of transport infrastructure have been highlighted in the IDP Review (2014/15). The Stellenbosch Municipality's recyclables are transported to the Kraaifontein MRF in Cape Town via the R304 and N1. All waste from the households within the Klapmuts area and waste from the Klapmuts Transfer Station is transported via the R44 to the Stellenbosch WDF. All waste from the Franschhoek area is transported via the R45 and then the Helshoogte Pass to the Stellenbosch WDF.

4.4.2.6.5 Witzenberg

The road network is rural and the major roads are the east-west R46 and north-south R303 that link most of the towns within the municipal area (2nd generation IWMP 2010).). All waste from Ceres, Nduli, Bella Vista, Op Die Berg and PA Hamlet are hauled via the R46 to the PA Hamlet WDF. All waste from Wolseley and Tulbagh are transported via the R303 to Tulbagh WDF.

4.4.2.7 Development profiles

Residential, commercial and industrial developments have an impact on the amount and types of waste generated as well as the different kinds of waste management services required within a municipal area. In order to facilitate integrated waste management planning, municipalities need to have a good understanding of the developmental and infrastructural needs within the municipal area. This together with the demographics of the municipal area is required for projecting current and future waste quantities. This section provides information on housing backlogs and delivery programmes for the CWDM and has been sourced from the 2014/15 IDP Reviews for the District and local municipalities as well as housing demand and delivery information sourced from the Western Cape Government: Department of Human Settlements.

4.4.2.8 Housing type

The inhabitants of the CWDM reside in a variety of housing types or dwellings. Statistics South Africa (Census 2011) defines the three main dwelling types as follows –

- Formal dwellings include a house or brick/concrete structure on a separate stand or yard or on a farm, flat or apartment in a block of flats, cluster house in a complex, townhouse (semi-detached house in a complex), semi-detached house, house/ flat/ room in a backyard and a room/ flatlet on a property or a larger dwelling/ servants' quarters/ granny flat;
- Informal dwellings include a backyard shack, a shack not in a backyard but in an informal/ squatter settlement (informal residential) or on a farm; and
- Traditional dwellings include huts and structures made of traditional materials such clay, mud, reeds or other locally available natural materials e.g. homesteads/ rondavels.

Figure 20 depicts the dwelling types and indicates the quality of housing in relation to human settlements. The majority of households in the CWDM are formal dwellings (83%) with 16% and less than 1% informal (includes 117 informal settlements) and traditional dwellings respectively.

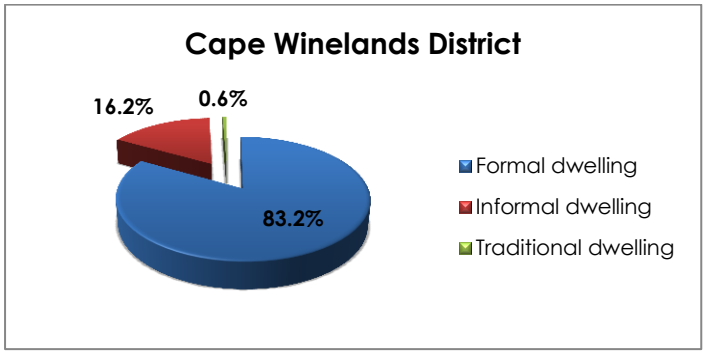


Figure 20: Access to housing

4.4.2.9 Housing demand and delivery

The IDP Review (2014/15) estimates the housing backlog in the CWDM to be about 40 000 units and approximately 13% of the Provincial backlog. The eviction of farm workers has contributed to this backlog and as a result the CWDM is actively involved in rural housing projects that are specifically targeted for farm workers (IDP Review, 2014/15). The IDP Review (2014/15) also highlights other factors that influence the delivery of housing such as land availability, location, bulk services capacity, statutory compliance processes (EIA's, HIA's rezoning applications), lack of effective strategies to deal with evictions and capacity constraints within local municipalities.

The Western Cape Department of Human Settlements (Raynita Robertson perscomm, 2015) highlights that Housing Demand databases within municipalities often include registered persons who may be residing within one District but have opted to register for a house in a different District. Figure 21 depicts the number of registered persons (78 518) on the Cape Winelands Housing Demand database. The Breede Valley Municipality has the greatest number of persons (24711) registered on the Housing Demand database with the lowest number of registered persons (6234) in the Witzenberg Municipality (Figure 21).

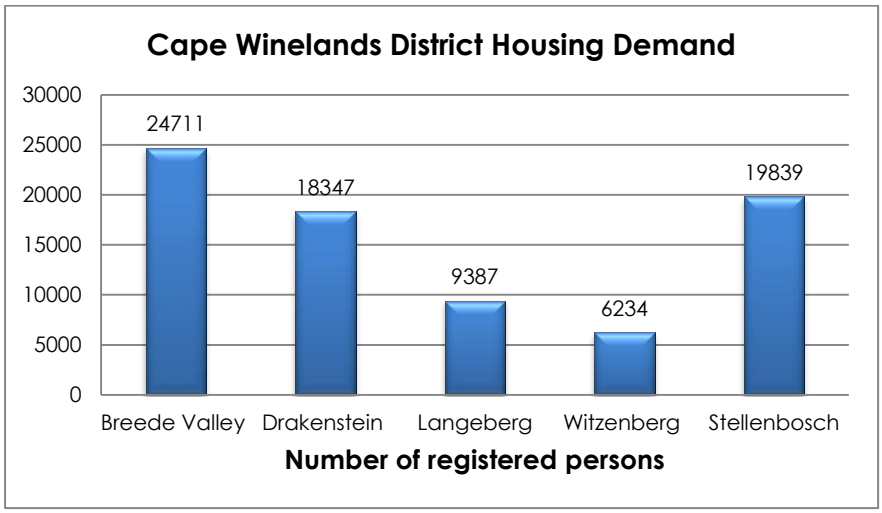


Figure 21: Housing Demand (as at July 2015)

Figure 22 depicts the estimated housing that can be delivered between 2009 and 2015 based on the available Division of Revenue Act (DORA) allocation and it also shows the potential housing that can be delivered between 2016 and 2021 with consideration for DORA allocation as well as project readiness. The project readiness is based on the following:

- Land obtained
- EIA Authorisation
- Consideration for bulk capacity
- Department of Human Settlements Approval
- Council Approval

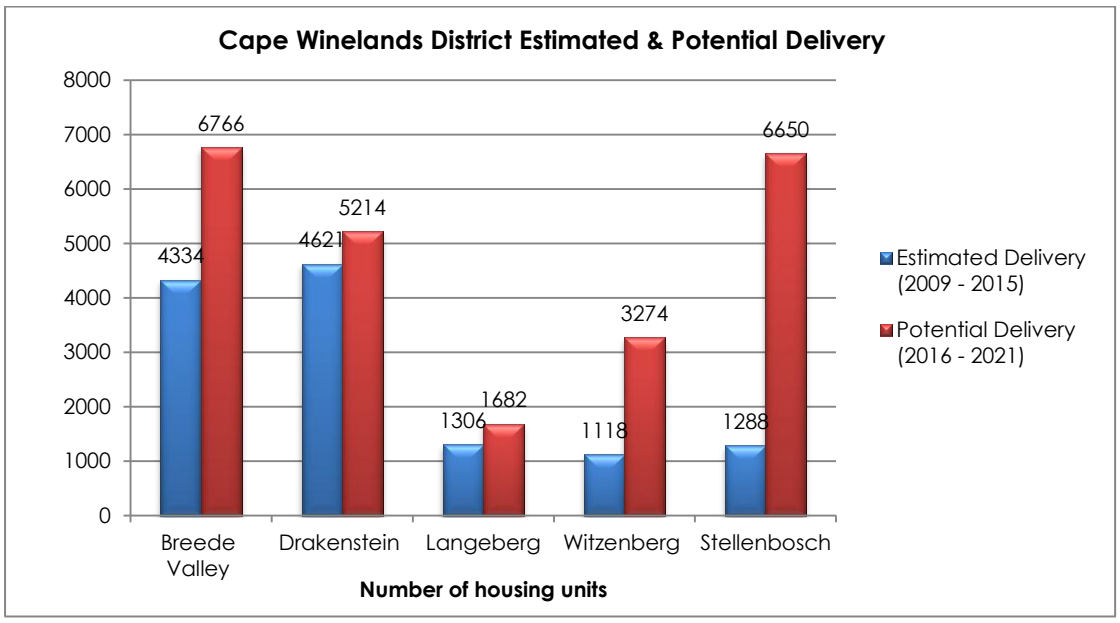


Figure 22: Estimated & Potential Housing Unit Delivery

The current housing backlog and IDP housing projects are shown in Table 11.

Table 11: Housing backlog and IDP projects (IDP Review 2014/15)

Municipality	Housing Backlog (units)	Housing projects	Budgeted/ Estimated Cost
Breede Valley	23 500	590 units 207 sites	R40 940 000
Drakenstein	22 748	400 units	R53 861 000
Langeberg	No clear indication	No clear indication	No clear indication
Stellenbosch	20 500	234 projects	R9.5 billion (over a 10 year period)
Witzenberg	No clear indication	No clear indication	R89 445 000 (2015 – 2019)

The municipal IDP Reviews (2014/15) highlights the following challenges regarding housing backlogs:

- The housing demand in the Drakenstein Municipality is increasing due to the eviction of farm dwellers and the expanding number of informal settlements and backyard dwellers,
- 6 000 units from the Stellenbosch Municipality's housing backlog will have to be built on municipal land. The majority of this land is currently used for agricultural purposes and as a result the Municipality intends to promote the concept of infill and redevelopment with higher densification.

4.4.2.10 Housing delivery and Service levels

This section focuses on how the current and future housing status will affect the provision of the waste collection service. The CWDM service levels data used in this section, basic services (91%) and free basic services (106%), was obtained from the Department of Local Government and provides the status of service levels as at June 2015. The data, however, does not provide specifics with respect to service provision to informal dwellings, particularly informal settlements.

Breede Valley

The service levels for the Breede Valley are at 100% for both basic and free basic services as at June 2015. The municipality has the highest number of people registered (24 711 as at July 2015) on the housing demand database. It also has the highest estimated housing delivery (4 334) between 2009 and 2015 as well as the highest potential housing delivery (6 766) from 2016 to 2021 of all the municipalities within the CWDM. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

Drakenstein

The service levels for Drakenstein are at 86% for basic services and at 100% for free basic services as at June 2015. The municipality has 18 347 people registered on the housing demand database (as at July 2015) and an estimated delivery of 4 621 houses between 2009 and 2015. Drakenstein also has a potential to deliver 5 214 houses from 2016 to 2021. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a basic service to the 14% of households without a service currently,
- improving the waste collection servicest, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

Langeberg

The service levels for Langeberg are at 100% for basic services and at 96% for free basic services as at June 2015. The Municipality has 9 387 people registered on the housing demand database (as at July 2015) and an estimated delivery of 1 306 houses between 2009 and 2015. Langeberg has a potential to deliver only 1 682 houses from 2016 to 2021, which is the lowest value in the District. Based on this data, it can be assumed that the Municipality's plans may focus on -

- providing a free basic service to the 4% of households without a service currently,
- improving the waste collection servicest, and
- providing a basic service to houses that will be delivered as per the Municipality's housing plans.

Stellenbosch

The service levels for Stellenbosch are at 79% for basic services and at 123% (percentage does not only include free services to the indigent but also includes free services to the formal and informal households that cannot afford to pay for the service) for free basic services as at June 2015. The Municipality has 19 839 people registered on the housing demand database (as at July 2015), the second highest backlog in the CWDM. The estimated housing delivery between 2009 and 2015 was 1 288 and the Municipality's potential to deliver houses is the second highest in the CWDM at 6 650 houses to be delivered from 2016 to 2021. Based on this data, it can be assumed that the Municipality's plans may focus on -

- providing a basic service to the 21% of households without a service currently,
- improving the waste collection servicest, and
- providing a basic service to houses that will be delivered as per the Municipality's housing plans.

Witzenberg

The service levels for Witzenberg are at 88% for basic services and at 144% (percentage does not only include free services to the indigent but also includes free services to the formal and informal households that cannot afford to pay for the service) for free basic services as at June 2015. The Municipality has the lowest housing backlog in the CWDM with 6 234 people registered on the housing demand database (as at July 2015). The estimated housing delivery between 2009 and 2015 was 1 118 and the Municipality has a potential to deliver 3 274 houses from 2016 to 2021. Based on this data, it can be assumed that the Municipality's plans may focus on -

- providing a basic service to the 12% of households without a service currently,
- improving the waste collection service, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

All the local municipalities within the CWDM either provide a communal waste collection service through skips and others provide a bag containment service in informal settlements. In formal dwellings, a bag containment is usually provide in low income housing and a wheelie bin containment service is usually provided in middle or high income housing. Municipalities might improve services by moving from communal waste collection to the provision of bags or from a bag containment service to the provision of wheelie bins.

Municipalities are faced with the challenge of increasing informal settlements and as a result are struggling to meet the demand for delivery of low income housing. The National Department of Human Settlements has the Upgrading Informal Settlements Programme (UISP), which is an initiative to aimed at upgrading informal settlements through various grants. The UISP aims to provide and improve basic services to informal settlements as well as provide secure tenure to ensure that informal settlements are in well-located and legal land. The provision of basic services includes the upgrade of a communal waste collection service to a household refuse collection or the provision of a bag containment service.

4.4.3 Waste generation areas

4.4.3.1 General waste

Waste generation rates varies between municipalities and the following rates, as reflected in the local municipal IWMPs were used.

- Witzenberg Local Municipality – 0.63kg/c/day
- Drakenstein Local Municipality – 0.97kg/c/day
- Stellenbosch Local Municipality – 0.85kg/c/day
- Breede Valley Local Municipality – 0.67kg/c/day
- Langeberg Local Municipality – 1.24kg/c/day

Based on the above rates it is estimated that waste generation figures in CWDM, using the 2015 population figures as the baseline, will increase by 6.2% by 2020, 16.4% by 2030 and 24.0% by 2040. The projected general waste generation figures include domestic, commercial and industrial waste. In some of the municipalities building rubble, recyclables and public cleansing waste are also included.

Figure 23 depicts waste generation quantities for CWDM for the years 2015 to 2040.

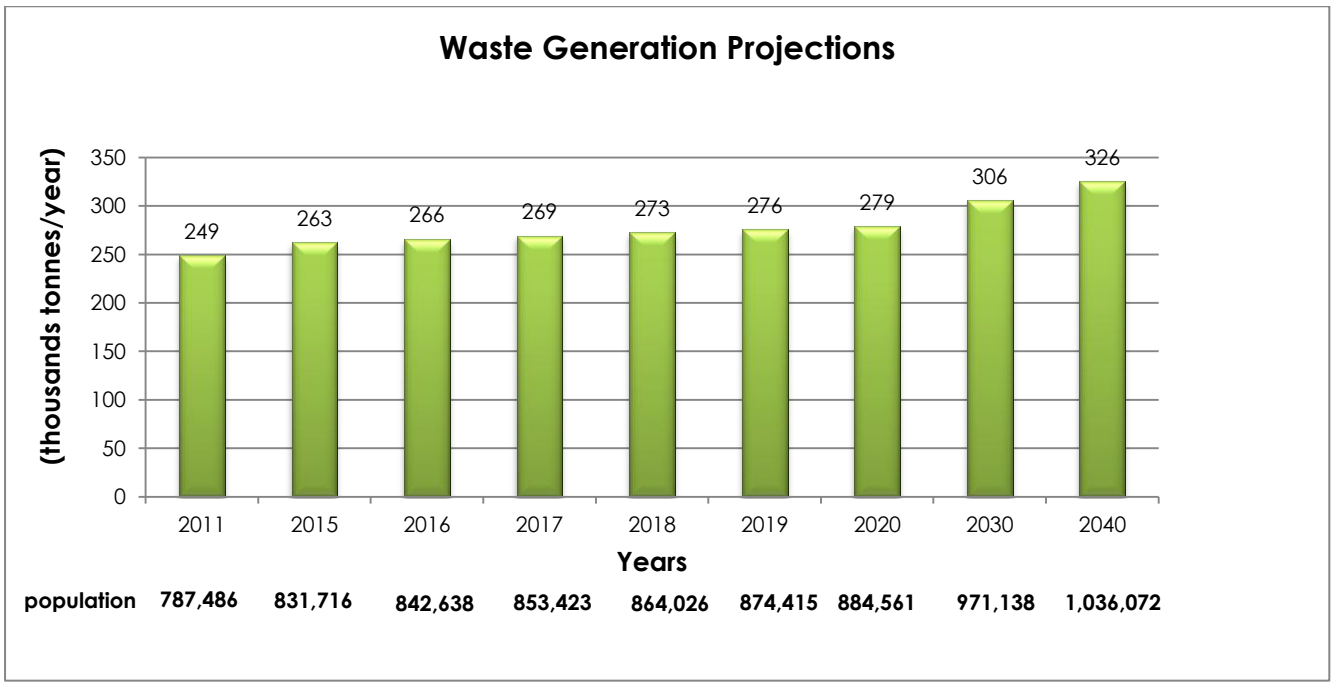
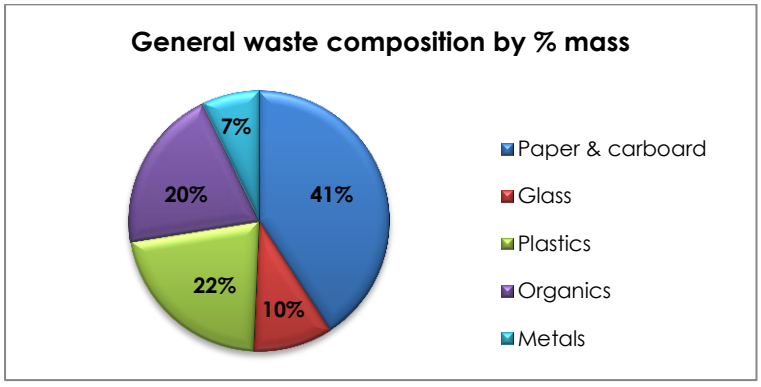


Figure 23: Waste generation quantities 2015 – 2040

4.4.3.2 Waste composition

4.4.3.2.1 General waste

The largest component of the DEADP 2007 waste characterisation survey conducted in CWDM is paper and cardboard in terms of mass and volume. The other major contributors towards the overall waste composition are plastics and organics.



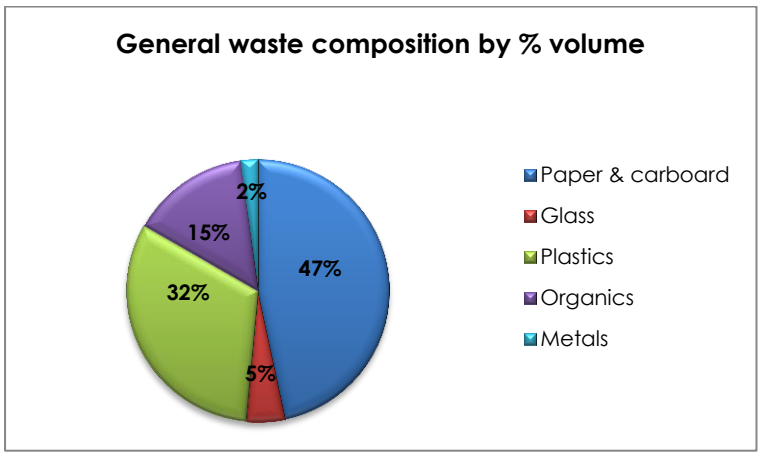


Figure 24: General waste composition by % mass and % volume

4.4.3.3 Health care risk waste

The Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007) defines Health Care Risk Waste (HCRW) as that portion of health care waste that is hazardous and includes infectious waste, pathological waste, sharp waste, pharmaceutical waste, genotoxic waste, chemical waste, waste with heavy metals, radioactive waste, and any other health care waste which is defined as hazardous in terms of the Waste Management Series: Document 1: Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, as published by the Department of Water Affairs and Forestry.

HCRW is either incinerated as a means of disposal or treated through Electro Thermal Destruction. Incineration of HCRW is one of the most effective means to eliminate the risks posed by health care risk waste and also reduces the overall volume of the waste. HCRW is mainly removed to be treated and disposed by service providers who have to be registered on the Western Cape Integrated Pollutant and Waste Information System (IPWIS) as required in terms of the National Environmental Management: Waste Act: National Waste Information Regulations, January 2013. The HCRW Generators are also required to register and report to the provincial IPWIS, which then exports the data onto the national waste information system (SAWIS).

According to the IPWIS (October 2015), 120 governmental, non-governmental and private healthcare facilities within the CWDM have registered and 65 are reporting on the provincial system to date.

Table 12 depicts the number and types of healthcare facilities available across CWDM.

Table 12: Healthcare facilities

Community health centres	Community day centres	Number of PHC clinics - fixed	Number of PHC clinics - non-fixed (satellites)	Number of PHC clinics - non-fixed (mobiles)	Number of district hospitals	Number of regional hospitals	Total
0	6	42	6	27	4	2	87

Source: WCG Provincial Treasury - Socio-economic Profile 2014 Working Paper

The amount of HCRW reported on IPWIS for the period January 2014 to August 2015 amounted to 3,521 tonnes. Figure 25 provides the percentage contribution of HCRW across CWDM.

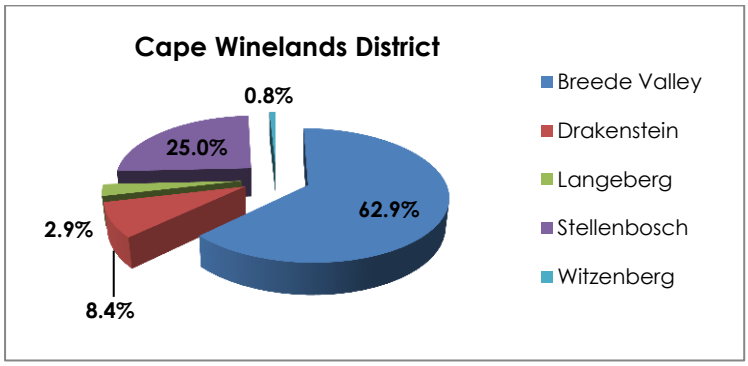


Figure 25: Healthcare risk waste percentage distribution

4.4.3.4 Hazardous waste

Nothing reported in the municipal IWMPs.

4.4.3.5 Problem waste streams

4.4.3.5.1 Agricultural waste

The main agricutural commodity in the District is grapes. There is a domination of grapes for wine, although increasingly table grapes are being planted. Cereals and fruit, both pome and stone, are the remaining dominant sectors36. There is a lack of information on the liquid and solid waste from the winemaking process.

[36] Western Cape Government: Water Infrastructure & opportunities for agriculture & agri-processing in the Western Cape (2015)

4.4.3.5.2 Sewage sludge

Table 13 depicts sewage sludge management in the CWDM.

Table 13: Wastewater Treatment Works and sewage sludge disposal

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Drakenstein	Gouda	No information received	Sludge sold for agricultural purposes.
	Hermon	No information received	Sludge sold for agricultural purposes.
	Paarl	780 tonnes/ month	Sludge sold for agricultural purposes.
	Pearl Valley	21 tonnes/month	Sludge sold for agricultural purposes.
	Saron	39 tonnes/month	Sludge sold for agricultural purposes.
	Wellington	No information received	Sludge sold for agricultural purposes.
Langeberg	Ashton	No information received	Sludge removed by farmers and used for agricultural purposes. Excess sludge disposed by municipality.
	Bonnievale	No information received	Sludge stockpiled near drying beds and removed by farmer for land application.
	McGregor	No information received	Sludge stockpiled prior to collection for disposal at Ashton WWTW.
	Montagu	Not applicable (ponds)	Maturation pond systems, no disposal of sludge.
	Robertson	No information received	Sludge stockpiled near drying beds and removed by farmer for land application.
Witzenberg	Ceres	No information received	No information received
	Op-die-Berg	No information received	No information received
	Tulbagh	No information received	No information received
	Wolseley	No information received	No information received
Stellenbosch	Klapmuts	58 m^3/day	Disposed at Stellenbosch WDF.
	Pniel	20m^3/day	Sludge is composted.
	Stellenbosch	211m^3/day	Sludge is treated and stockpiled prior to collection by a private company for composting.
	Raithby	20 m^3/6 months	Sludge is disposed of at the Stellenbosch WDF.
	Wemmershoek	54 m^3/day	Sludge is taken to Vissershok.

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Breede Valley	De Doorns	No information received	Sludge is treated, classified and stock piled prior to been taken by farmer.
	Rawsonville	0.5 m^3/week	Treated and taken to Worcester WWTW prior taken by farmer.
	Touwsivier	No information received	In a process of classifying the sludge, will be used accordingly.
	Worcester	No information received	Sludge treated, classified and stockpiled prior taken by farmer.

4.4.3.5.3 Abattoir waste

The following information was obtained regarding management of abattoir waste in CWDM.

Table 14: Abattoir waste

Municipality	Number of abattoirs	Disposal methods	Disposal quantities
Drakenstein	2	Abattoir waste is not accepted at the municipal WDFs.	Unknown
Langeberg	2	Waste is buried in trenches at the Ashton WDF.	2128.40 tonnes (Jan - Nov 2015)
Witzenberg	1	The abattoir has on-site consumption pits, no abattoir waste is accepted on WDFs.	Unknown
Stellenbosch	0	There are no abattoirs in the municipality. Abattoir waste is not accepted at the WDFs. A veterinary laboratory in Stellenbosch incinerates and buries its waste on the premises.	Unknown
Breede Valley	1	Waste is buried in trenches at the Worcester WDF.	Approximately 32m^3

4.4.3.5.4 Tyres

Handling of tyre waste and quantities are unknown due to limited reporting from industries.

4.4.4 Waste avoidance, reduction and recycling[37]

The District Municipal Health Services division implements waste awareness programmes. This entails education material provided to schools and business premises. The intention is to capacitate individuals on the 3R's of the waste management hierarchy: Reduce, Re-use, Recycle.

Below is a synopsis of various waste minimisation and job creation initiatives in the various local municipalities.

4.4.4.1 Breede Valley Municipality

Waste awareness

- "Bin- Bin" is the municipality's mascot for waste education at schools, clean-up campaigns and at various public engagements within the municipal area;
- The municipality uses newsletters and local newspapers to communicate waste management information to its citizens;
- Information pamphlets on what can be recycled are also distributed to households.

Waste minimisation

- The municipality provides support to swop shops in Avian Park and Zwelethemba;
- Ongoing waste separation at source in high income areas;
- The municipality has a Material Recovery Facility in Touws River and Drop off facilities for e-waste and household hazardous waste at Worcester WDF;
- The municipality has recycling bins at Mountain Mill Mall; and
- Recyclables collected are provided to an association for disabled people for waste crafting projects.

Job creation

- The municipality has Expanded Public Work Programme (EPWP) workers for area cleaning and appoint unemployed people on a short term basis as required.

[37] Greenest Municipality Competition: Waste Management Report 2015/2016

4.4.4.2 Drakenstein Municipality

Waste awareness

- Recycling projects are run by a few schools, churches and old age homes in the municipality;
- Youth employed through the DEA's Youth in Waste programme assist the municipality with their awareness campaign;
- The municipality organises a waste week to raise awareness around waste minimisation amongst the community and the target audience are school learners and administration staff;
- Waste awareness signage is placed throughout the municipality;
- The municipality places weekly articles in the local and municipal newsletters.

Waste minimisation

- Recycling bins are placed in public areas such as the shopping malls, pedestrian walkways in the town centres in the form of double bins;
- Chipped green waste is sold at the WDFs and at the transfer station;
- Waste is separated at source in the higher income communities;
- The municipality appointed a contractor for builders' rubble crushing;
- Recycling igloos are placed strategically within the municipal area to ensure accessibility and participation by the general public;
- Schools are taken on tours of the waste management facilities as part of the waste awareness week campaign which includes an exhibition at the Paarl Mall.

Job creation

- The Municipality has employed 200 people through the implementation of waste related EPWP projects.

4.4.4.3 Langeberg Municipality

Waste awareness

- Articles about waste related activities are published in the local newspaper, the Langeberg Express, are used to publish articles about waste related activities.
- The waste collection vehicles have signage which informs the public about recycling.
- Pamphlets are distributed on a regular basis to inform residents about the amounts of waste recycled, as well as waste minimisation measures e.g. composting.

Waste minimisation

- A split bag system is implemented in all residential areas within the municipality, and includes the lower income residential areas.
- Recycling igloos are strategically placed at schools and in the CBD and the Municipality has drop-off facilities for the public to drop recyclable items.
- The municipality has a clean MRF at Ashton WDF. Recyclables from the split bag system are further separated at the facility.
- Chipping and composting of green waste takes place at the Robertson Drop-off Facility, for which the municipality has a three year tender in place.

Job creation

- The Municipality employs EPWP workers and TEDCOR waste interns at the MRF to sort and group recyclables as well as for cleaning projects.

4.4.4.4 Stellenbosch Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- The municipality partners with event organisers of the big festivals that take place in the municipal area to create waste awareness at these events.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- The use of a Bokashi treatment system for the fermentation and composting organic waste takes place in informal settlements. Enkanini is one of the townships participating in the project. Events' greening is a requirement before granting permission to host an event in the Stellenbosch Municipal Area.
- A split bag system is operational primarily in the medium and high income areas.
- Minimal recycling takes place in low income residential areas.
- The municipality supports Huis Horison (a facility for persons with disabilities), who further sorts the waste from the municipality's split bag programme.
- Stellenbosch Municipality has outsourced the chipping and composting of green waste. Chipped green waste is mixed with treated sewerage sludge from waste water treatment works to produce compost.
- The municipality has approached neighbouring municipalities to consider a regionalised approached to the treatment of organic waste.

Job creation

- The Youth in Waste project is active in the municipality whereby 12 previously unemployed youth with matric or a higher qualification were placed to gain specific waste related skills, e.g. waste administration, waste education, awareness training and landfill supervision.
- The Human Resources Department has dedicated a budget for training of its personnel on the basics of waste management.

4.4.4.5 Witzenberg Municipality

Waste Awareness

- The municipality has an external newsletter for the general public which covers issues such as waste minimisation and other greening initiatives;
- Effective waste minimisation practices are communicated through the use of the municipality's internal newsletter.
- Schools form a great part in awareness. They are specifically involved through the Ceres Omgewingsbestuur (CEROM Schools) waste project as well as the Nduli Swop Shop. The municipality supports the CEROM Schools Waste Project with black bags and gloves. This project identifies problem areas in terms of littering and a waste clean-up action is then organised and executed by the educators and learners.
- The local community newspaper (Witzenberg Herald), the local community radio station (Valley FM), social media pages such as Facebook, the internet and the municipal website are all media through which information about waste activities, is shared.
- Waste related signage is also used to raise awareness. Corporate signage is present at the municipal offices to promote specific environmental projects.

Waste minimisation

- Low income areas host the Nduli swop shop and the municipality supports them through the collection of recyclables.
- Recycling in the lower income residential areas is facilitated by the Tulbagh Disabled People of South Africa. Recyclables are collected in the lower income residential areas, which are then sold off to generate an income for the organisation.
- Garden waste is diverted through the use of a collection service and skips.
- Another means of minimisation is the placement of recycling igloos at local businesses and schools in Tulbagh, Agrimark in Wolseley and the Tulbagh landfill site. While in Ceres Spar and Pick 'n Pay are the home of recycling igloos for this town.
- The area does not have a material recovery facility, but supports a local recycler who recovers huge volumes of recyclables within the municipal area. Green waste is chipped by the Municipality, while a private composter is also supported by the Municipality. The compost is then used for crops and other agricultural projects.
- Excess builder's rubble is used for landfill coverage at the Tulbagh and Prince Alfred's Hamlet WDFs.
- Other waste minimisation initiatives include the use of waste for crafting by the Disabled People of South Africa and schools such as Woveren and Tulbagh High Schools.
- The municipality has an internal newsletter which promotes waste reduction and source separation practices. The CEROM Schools Waste Awareness Project and the Nduli Swap Shop focusses on raising awareness around waste minimisation and recovery with schools in the Municipality. The CEROM Schools Waste Awareness Project forms part of an international twinning agreement with the Essen Municipality in Belgium. The local media is used for spreading waste minimisation by placing advertisements in the local newspaper such as the Witzenberg Herald and interviews are held at the local Witzenberg Radio station. Signs and indicators are placed on municipal waste bins on the sidewalks as well as indicators at waste disposal facilities. Corporate signs at all the municipal offices in the different towns enhance the promotion of certain projects. Composting is also done by private businesses within the Witzenberg municipality.

Job creation

- EPWP workers were appointed in order to clean up streets, pavements, riverbanks and open spaces in the municipality. Thirty people are employed through this programme.
- Thirty previously unemployed individuals from the municipality are contracted monthly as part of a Clean 'n Green programme.
- Community workers programme is in progress to maintain a clean environment within the municipal jurisdiction.

4.4.4.6 Waste information[38]

4.4.4.6.1 Breede Valley

The municipality reports on waste types and quantities to the Department using the provincial Waste Calculator.

4.4.4.6.2 Drakenstein

The municipality reports regularly to the IPWIS, however, there is room for improvement as not all reports have been received.

4.4.4.6.3 Langeberg

The municipality reports on waste types and quantities to the Department using IPWIS and the provincial Waste Calculator.

4.4.4.6.4 Stellenbosch

The municipality's reporting to the IPWIS system is considered to be good; however there is room for improvement as not all monthly reports have been received.

4.4.4.6.5 Witzenberg

The municipality is partially compliant with regards to reporting to IPWIS.

[38] Greenest Municipality Competition: Waste Management Report 2015/2016

4.4.5 Treatment and disposal

4.4.5.1 Conditions of waste management facilities

Figure 26 depicts compliance scores at WMFs that were audited in the 2015/16 financial year. Key challenges experienced at the WMFs are lack of cover material, windblown litter, fencing, storm water management, limited machinery and component security and operational staff. Burning of waste takes place at most facilities. Facilities which yielded red ratings (0 -64%) and amber ratings (65 – 84%) will receive priority for the 2016/17 financial year.

Compliance scores ratings:

Total	Status Indicator		Action
85 – 100 %	Green	X	Small changes needed
65 – 84 %	Amber		Improvements required
0 – 64 %	Red		Major improvements required

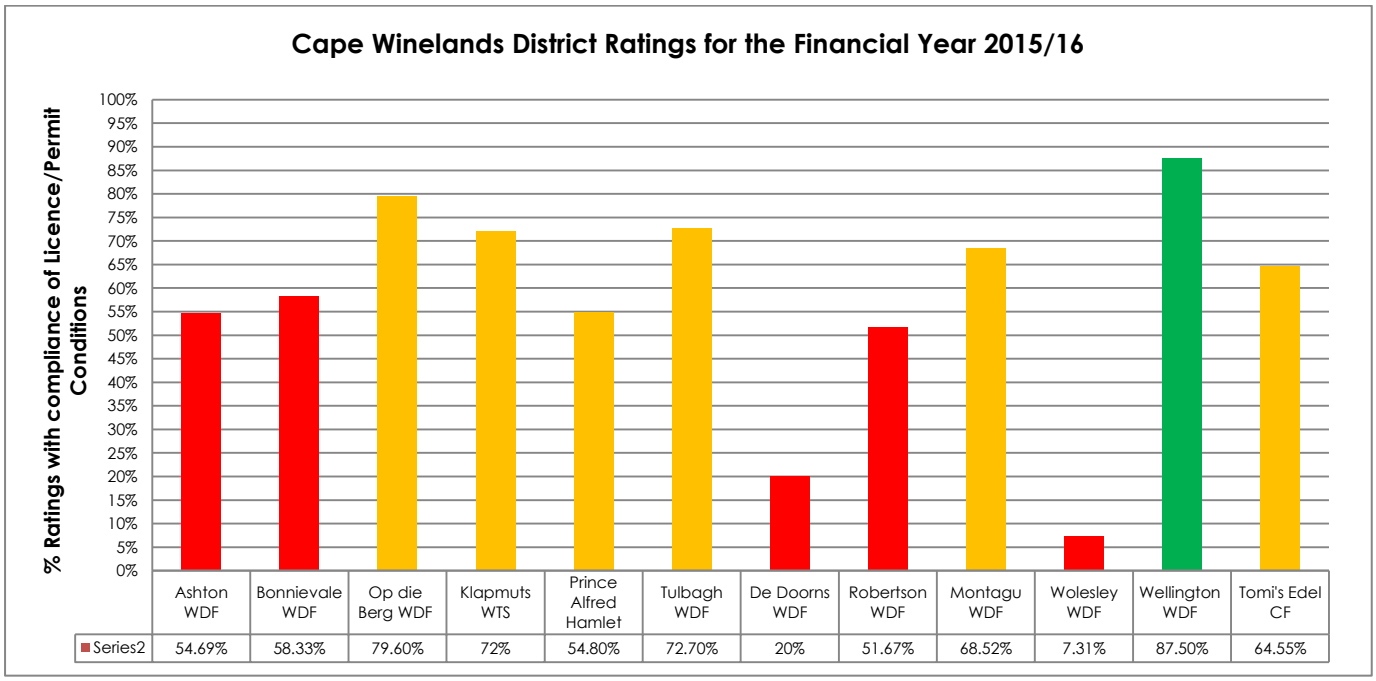


Figure 26: Compliance audit outcomes of Waste Management Facilities

The status quo of waste management facilities in CWDM are provided in Table 15. It should be noted that WDFs which were issued with decommission licences during the 2014/15 fiscal year have licence conditions to commence with decommissioning within a 5 year period of date of issue. This condition was implemented to allow the municipalities to plan and prepare alternatives for the closure of the waste disposal facilities.

Table 15: Conditions of Waste Management Facilities

Munipalities	Waste management facility	Classification	Licence type	Available airspace (incl years)
Witzenberg	WolseleyWDF	G:S:B-	Operation	Sufficient capacity until 2018
	Tulbagh WDF	G:S:B+	Operation	Unknown
	Op-die-Berg WDF	G:C:B+	Operation	Unkown
	Prince Alfred Hamlet WDF	G:C:B-	Decommission (2014/15)	n/a
	Ceres WDF	G:M:B+	Decommission	n/a
Drakenstein	Wellington WDF	G:M:B+	Operation	Untill 2018 (2011 data)
	Daljosafat WDF	n/a	Decommission (2014/15)	n/a
	Paarl WDF	G:S:B+	Decommission (2014/15)	n/a
	Saron WDF	n/a	Decommission (2014/15)	n/a
	Paarl/Orleans WDF	n/a	Decommission (2014/15)	n/a
	Hermon WDF	n/a	Decommission (2014/15)	n/a
	Klapmuts WDF	G:S:B+	Decommission (2014/15)	n/a
	Gouda WDF	n/a	Decommission (2014/15)	n/a
	Wellington WDF	H:h	Decommission	n/a

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Munipalities	Waste management facility	Classification	Licence type	Available airspace incl years
Stellenbosch	Stellenbosch WDF	G:M:B+	Operation	Almost full (No medium & long term capacity)
	Klapmuts RTS	n/a	Operation	n/a
Breede Valley	De Doorns WDF	n/a	Decommission (2014/15)	n/s
	Worcester WDF	Class 2	Operation	313,084m^3 (2011 estimate)
	Touws River Communal WDF	n/a	Operation	Unknown
	Rawsonville WDF	n/a	Decommission	Unknown
	Touws River WDF	G:C:B-	Decommission (2014/15)	n/a
Langeberg	Ashton WDF	G:C:B-	Operation	Reached capacity in 2014
	Montagu WDF	G:C:B-	Operation	Insufficient capacity
	McGregor WDF	G:S:B-	Closure	Unknown
	Bonnievale WDF	G:S:B-	Operation	Unknown

4.4.5.2 Regionalisation of waste management

Due to limited airspace at most of the waste disposal facilities in the District the CWDM has recognised the need for a suitable regional disposal facility. Due to the geographical divide of the Du Toitskloof mountains it has been decided that two regional facilities (eastern and western) will be required to service the CWDM area.

A study has been conducted in the feasibility of a regional WMF. Five potential sites were identified: four of which could possibly service the CWDM are to the east; and one which could service the CWDM to the west of the Du Toitskloof mountains.

The preferred site is next to the existing waste disposal facility in Worcester which will serve Witzenberg, Langeberg and Breede Valley Local Municipalities (east of Du Toitskloof mountains). A waste management licence was issued in May 2015. The facility is classified as a G:M:B- (Class B) and will only accept general waste. The site has spatial provision for a future MRF. The footprint of the facility covers an area of 48.1hectare.

4.4.6 Current and upcoming alternative waste treatment options

The following sustainable integrated waste management advancements are underway in CWDM.

4.4.6.1 Stellenbosch Local Municipality

The municipality's waste disposal facility has only 3 years of airspace left. A service provider has been appointed to undertake a feasibility study into a waste to energy facility. The results of this study will be integrated into the 2rd generation IWMP which is currently being developed by the municipality. The feasibility study will feed into the Section 78 (3) process of the MSA (2000) which will determine the technical, financial and risk profile of the alternative approaches to solid waste management in the Stellenbosch Local Municipality. GreenCape is currently modelling scenarios for alternative waste treatment for the municipality to evaluate their relative financial and environmental implications.

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4.4.6.2 Drakenstein Local Municipality

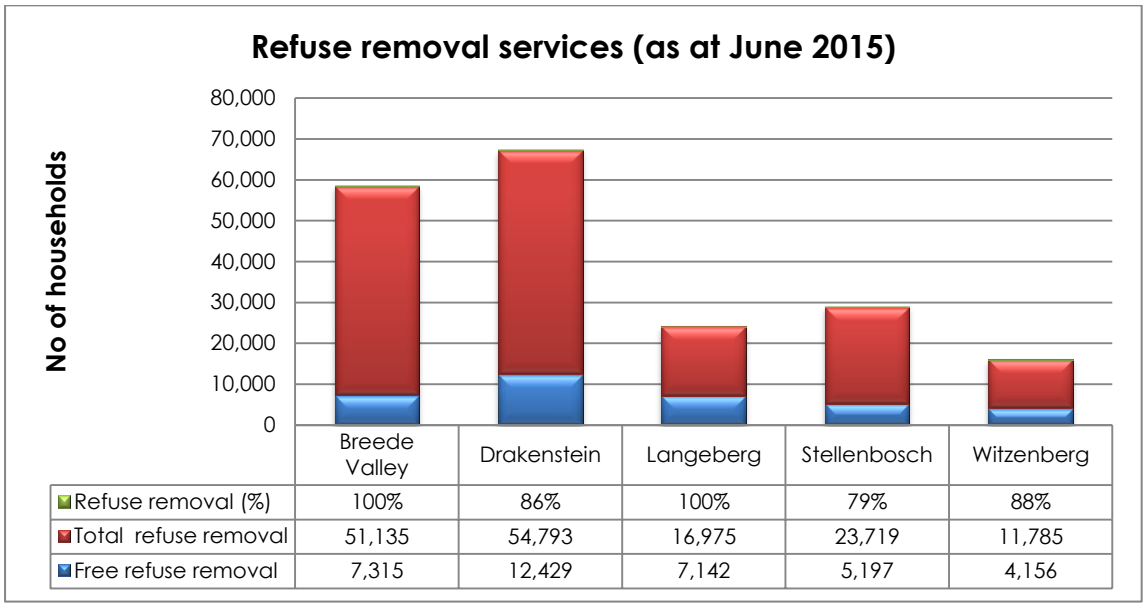
The municipality plans to develop a waste-to-energy facility which will most likely be located at an extension of the Wellington Waste Disposal Facility. Interwaste is the appointed service provider and has signed a memorandum of agreement with the municipality. The project is divided into three phases:

- Phase 1: operating the existing WDF, organising waste recycling and source separation in Drakenstein. This is expected to achieve a 56% reduction in the amount of waste currently landfilled in Drakenstein.
- Phase 2: Developing an anaerobic digestion facility with an installed capacity of 2 MW.
- Phase 3: Adding a direct combustion facility into the anaerobic digestion facility with a total installed combined capacity of 12 MW, 10 MW generated from the incineration plant.

The combined total costs for the 3 phases is R450 million. Interwaste has initiated an Environmental Impact Assessment for such a facility. A consideration is the Klapmuts facility in Stellenbosch Municipality as a possible location. The biggest threat to the implementation of phases 2 and 3 will be securing enough waste for the project as Drakenstein Municipality currently does not have the volumes required to make the waste-to-energy project financially viable. A total of 300 tonnes of additional waste will have to be imported into the preferred site (Wellington or Klapmuts) to make the project financially viable. A key element of this project is the ability of the municipality to procure the electricity generated at a potentially higher price than current Eskom grid electricity.

4.4.7 Status of waste collection services

Figure 27 depicts the level of domestic waste collection services in CWDM as at June 2015. The level of services varies between 79% to 100%. There is much room for improvement in providing refuse removal services to communities being serviced by the local municipalities.



	Breede Valley	Drakenstein	Langeberg	Stellenbosch	Witzenberg
Refuse removal (%)	100%	86%	100%	79%	88%
Total refuse removal	51,135	54,793	16,975	23,719	11,785
Free refuse removal	7,315	12,429	7,142	5,197	4,156

Figure 27: Refuse removal services as at June 2015 (Source: Provincial Treasury, 2015)

4.4.7.1 Public cleansing and illegal dumping

All towns in CWDM receive street cleansing service in the CBDs and areas where illegal dumping occurs.

Illegal dumping is a recognised problem in CWDM. It is noted that for the 2013/14 financial year, the cost of illegal dumping in Drakenstein, Stellenbosch and Witzenberg Municipality was R1 765 499, R6 500 000 and R525 813 respectively. Cleaning up of illegal dumping give rise to increased costs associated with clean-up efforts.

4.4.8 Cost of existing waste management system

Numerous attempts were made to obtain financial information around solid waste management from most local municipalities, however, this has been unsuccessful, with the exception of a few. Consequently, DEADP obtained financial OPEX and CAPEX (audited) for all local municipalities from Provincial Treasury. It should be noted that these are financial summaries of waste management services.

Table 16: CAPEX for CWDM (2011/12 – 2014/15)

CAPEX	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Breede Valley	639	1 000	513	2 053
Drakenstein	6 875	3 407	634	6 094
Langerberg	5 916	5 009	1 934	3 411
Stellenbosch	18 819	6 109	523	5 894
Witzenberg	743	343	1 538	Unknown
Total	32 994	15 867	5 142	17 451

Source: Provincial Treasury, 2015

Table 17: OPEX Revenue for CWDM (2011/12 – 2014/15)

OPEX-Revenue	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Breede Valley	30 850	35 905	39 108	40 449
Drakenstein	70 471	77 092	87 458	117 983
Langeberg	13 784	23 695	18 920	20 010
Stellenbosch	42 611	40 982	44 283	67 933
Witzenberg	15 505	17 408	18 749	18 733
Total	173 220	195 082	208 518	265 108

Source: Provincial Treasury, 2015

Table 18: OPEX Expenditure for CWDM (2011/12 – 2014/15)

OPEX-Expenditure	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Breede Valley	24 024	33 891	36 539	28 072
Drakenstein	46 584	52 600	77 473	155 966
Langeberg	19 335	22 805	21 326	23 497
Stellenbosch	35 430	45 062	56 044	62 278
Witzenberg	22 129	22 071	25 235	23 374
Total	147 503	176 428	216 618	293 187

Source: Provincial Treasury, 2015

Figure 28 shows the OPEX Revenue vs OPEX Expenditure for waste management services in the various local municipalities. As can be seen most municipalities generate just enough revenue to meet their expenses. In the case of Drakenstein there is a significant shortfall. However, Breede Valley is making a profit on the services provided.

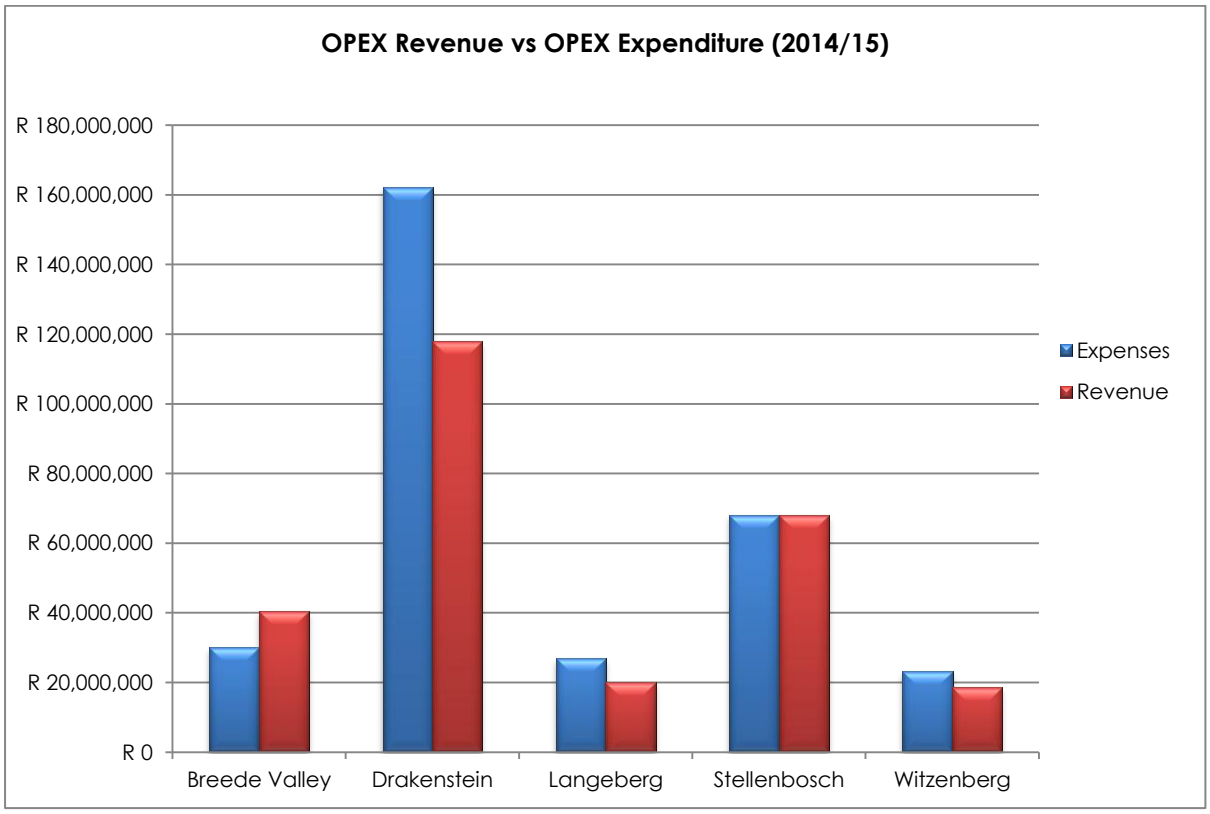


Figure 28: OPEX Revenue vs OPEX Expenditure: 2014/15 (Source: Provincial Treasury, 2014/15)

4.4.8.1 Free basic services

The following information has been received regarding free basic services according to the National Framework for Municipal Indigent Policies[39].

Witzenberg Local Municipality

The municipality currently has 2,729 indigent households. Witzenberg has been allocated R13 817 995, an equitable share of nationally collected revenue, to provide free basic services to indigents and to address their basic needs.

[39] https://www.westerncape.gov.za/text/2012/11/national_framework_for_municipal_indigent_policies.pdf [accessed 14 January 2016]

4.4.9 Governance

The CWDM does not have a dedicated component for waste management. This function is however fulfilled by the Technical Services Department and Environmental Health Practitioners. The District has a designated WMO. A support forum has been established where waste management challenges are discussed and solutions identified.

The organisational structure for the various municipaliteis are depicted in Table 19.

Table 19: Organisational structure

	Drakenstein	*Witzenberg*	*Stellenbosch*	*Breede Valley*	*Langeberg*
Dept responsible for waste management	Solid Waste Management	Technical Services	Engineering Services	Solid Waste and Area Cleaning	Solid Waste Management
Designated WMO	Yes	Yes	Yes	Yes	In the process of appointing a designated WMO.
Vacancies	3 vacancies	Unknown	Unknown	Unknown	23 Vacancies
Staff training & development	None specific to waste management	Unknown	Unknown	Unknown	Skills development plan
Waste policy & by-laws aligned with Waste Act & NWMS	Yes	In the process of updating current Waste By-law	No Waste By-law	Waste By-law not aligned with Waste Act	Draft Waste By-law which needs to be approved by Council
Private sector involvement (collection, disposal, waste minimisation)	No	Disposal & waste minimisation	Unknown	Unknown	Yes
CBOs &NGOs interested in waste field	Yes	Yes	Unknown	Unknown	None

Source: Local Municipalities, 2015

4.5 CENTRAL KAROO DISTRICT MUNICIPALITY

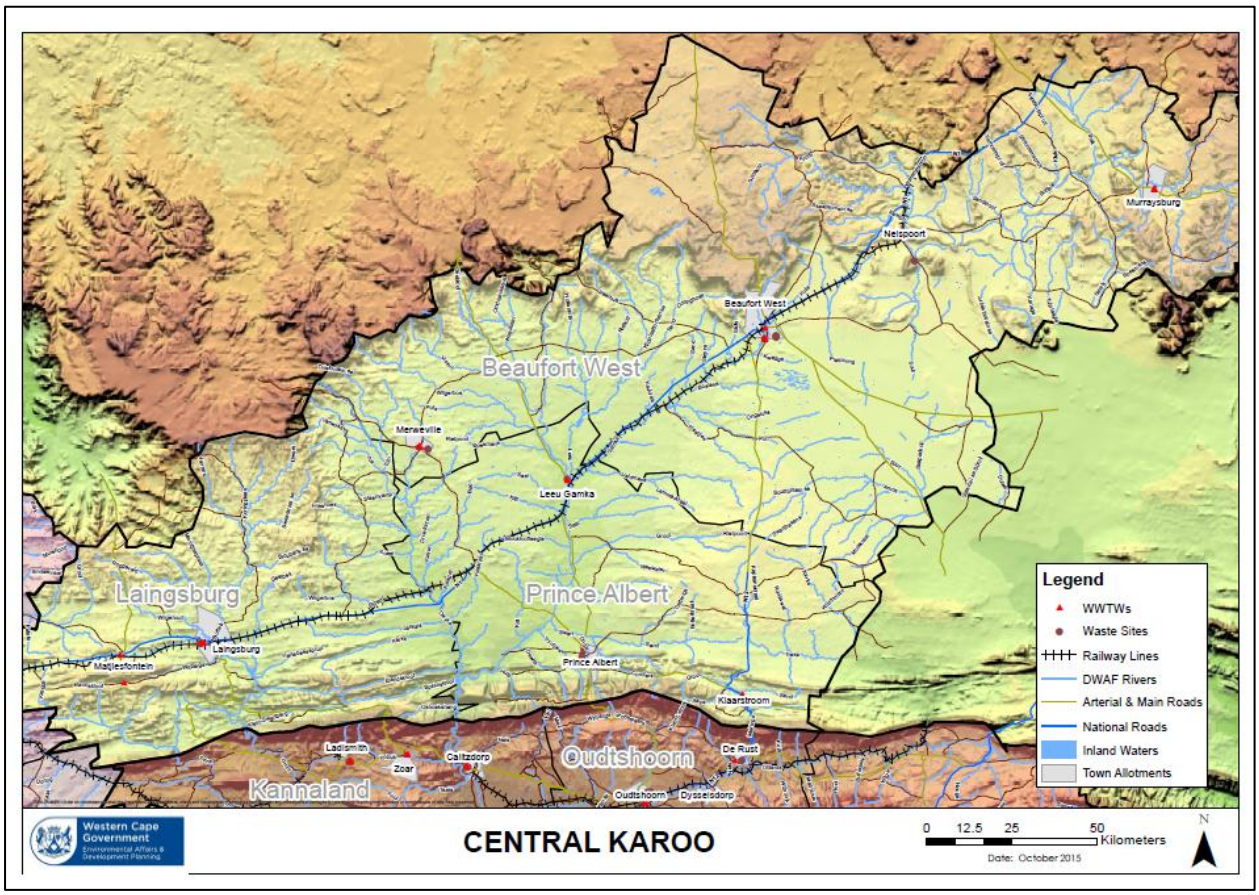


Figure 29: Geographical area of Central Karoo District Municipality

4.5.1 Geographical Area

The Central Karoo District Municipality (CKDM), a category C municipality, is situated in the north eastern part of the Western Cape province, bordering the Northern Cape on the west and the Eastern Cape on the east. It is the largest District in the province with an area of approximately 38 853km². CKDM comprises the local municipalities of Beaufort West (B3),) Laingsburg (B3) and Prince Albert (B3). The area is mainly characterised by residential and agricultural land. There are no major industrial land uses within its boundaries. The residential areas vary from the larger towns of Beaufort West and Laingsburg to rural towns, smallholdings and farms. The region experiences cold winters and very hot summers with the majority of the rain falling during the summer months of November to May.

4.5.2 Demographics

This section provides the socio-economic characteristics of the population within the CKDM based on statistical data for factors such as population, economic status, level of education, income level and employment status. Where no waste quantities are available, population and socio-economic status data can be used to estimate current and future waste quantities generated within the District.

4.5.2.1 Current population and growth estimates

Table 20 depicts the population growth in CKDM and serves as an indication of demand for service delivery provision, which includes integrated waste management services.

Table 20: Population growth (2001 – 2011)

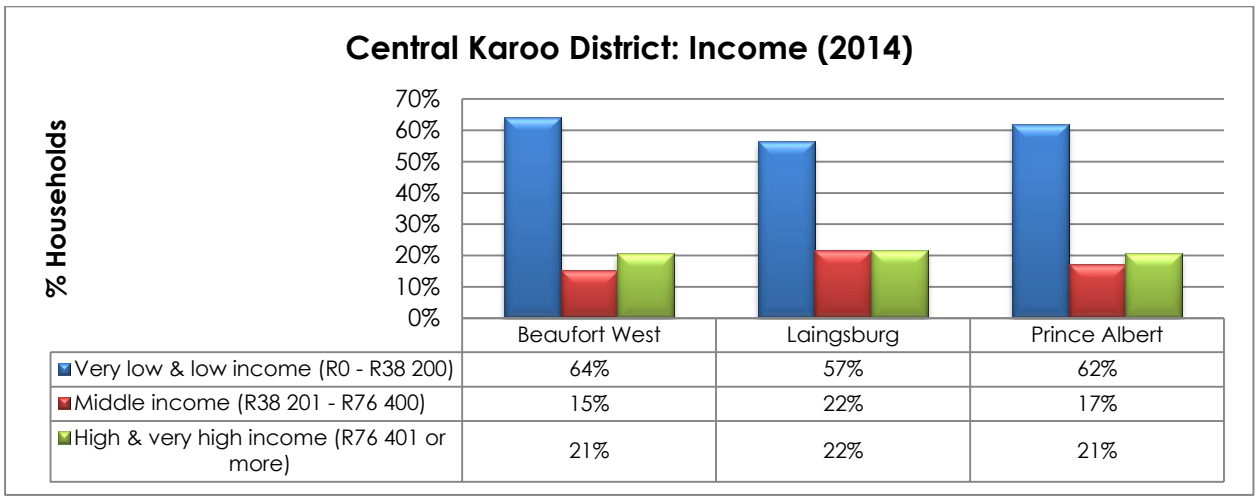
Municipality	2001	2011	Average annual growth (%)
Laingsburg	6,679	8,289	2.2
Prince Albert	10,518	13,136	2.2
Beaufort West	37,110	49,586	2.9
Central Karoo	**54,307**	**71,011**	**2.4**

(Source: STATS SA)

The district has grown at a rate of approximately 2.4% between 2001 – 2011. Beaufort West Municipality experienced the highest growth (2.9%) with Prince Albert and Laingsburg Municipalities the lowest growth rates of 2.2%. Population growth in the CKDM implies an increase in waste generation between 2001 and 2011.

4.5.2.2 Household income levels

Figure 30 depicts the various income levels in CKDM for 2014.



	Beaufort West	Laingsburg	Prince Albert
Very low & low income (R0 - R38 200)	64%	57%	62%
Middle income (R38 201 - R76 400)	15%	22%	17%
High & very high income (R76 401 or more)	21%	22%	21%

Figure 30: Household income levels, 2014 (Source: Provincial Treasury, 2014)

The majority of the households fall within the very low and low income group (R0 – 38 200). The Laingsburg municipality is higher by only 1% in the number of households within the high and very high income group compared to the other 2 municipalities.

4.5.2.3 Employment[40]

Figure 31 depicts the distribution of skills levels in the CKDM for 2013. The employment status of the CKDM indicates that the majority of employed people fall within the semi- and unskilled formal employment category (8 007) and only 1 806 people fall within the highly skilled formal employment category. The disparity between demand and supply for labour skills is indicated in the MERO Report (2014). It specifically highlights the oversupply of the semi- and unskilled employment category as indicated in Figure 31.

[40] Highly skilled occupations include managers, professionals and technicians, semi-and unskilled labour include domestic workers and other elementary workers and skilled all other occupations, e.g. clerks, sales & services, skilled agricultural workers, crafts, machine operators, etc. (StatsSA Labour Force Survey, LFS and QLFS).

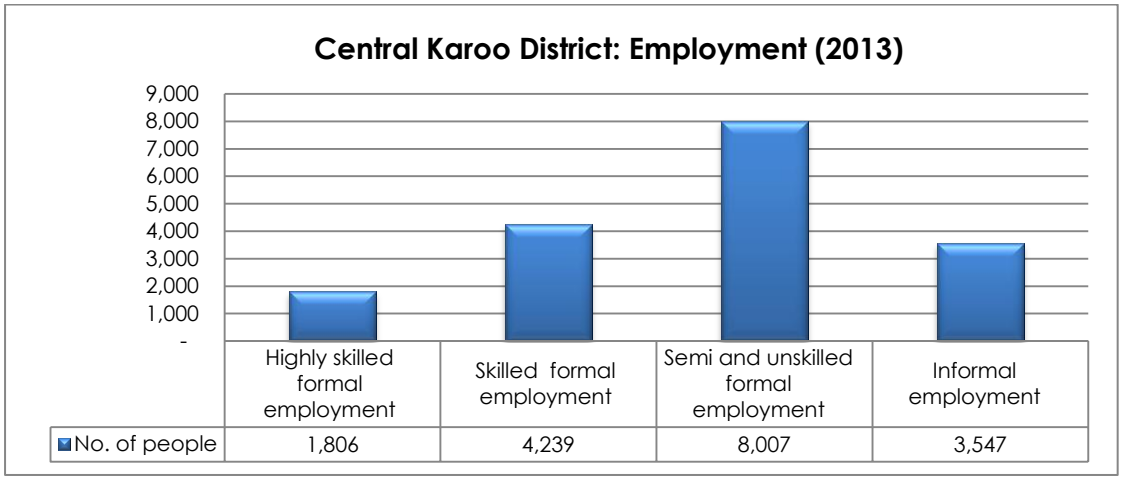


Figure 31: Employment 2013 (Source: MERO, 2014)

4.5.2.4 Level of education

The level of education is considered an indicator of the potential for employability, although this will be influenced by employment opportunities available within the district based on growth and development potential in the area. The Regional Development Profile documents (WCG: Provincial Treasury, 2012) emphasise the importance of education in improving access to employment opportunities and in sustaining as well as accelerating economic growth. Figure 32 depicts the level of education in the CKDM for the years 2001 and 2011 (Census, 2011). A great number of people within the CKDM have received secondary schooling and passed Matric/Grade 12 with very few people that have received higher education.

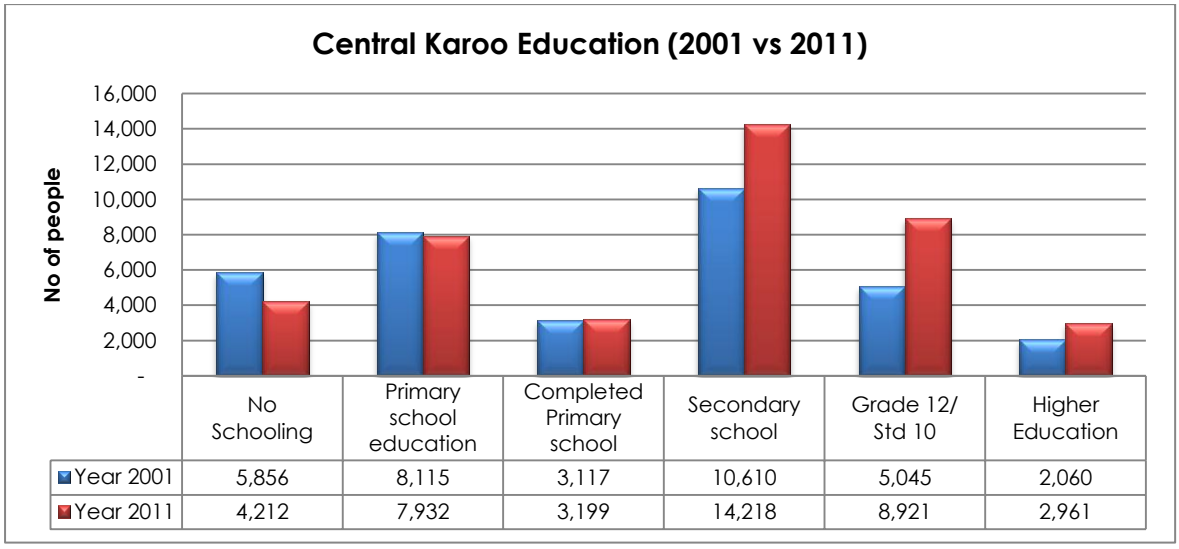


Figure 32: Education (2001 vs 2011)

4.5.2.5 Economic status

Figure 33 provide the real economic growth rate (percentage real GDPR growth) of the main sectors for the CKDM. The tertiary sector dominates in the district contributing to 74% of the GDPR. Dominant sectors are Business Services (17.8%), General Government (13.4%) and Wholesale & Retail Trade (12.1%). This provides an indication of the types of waste being generated within the district.

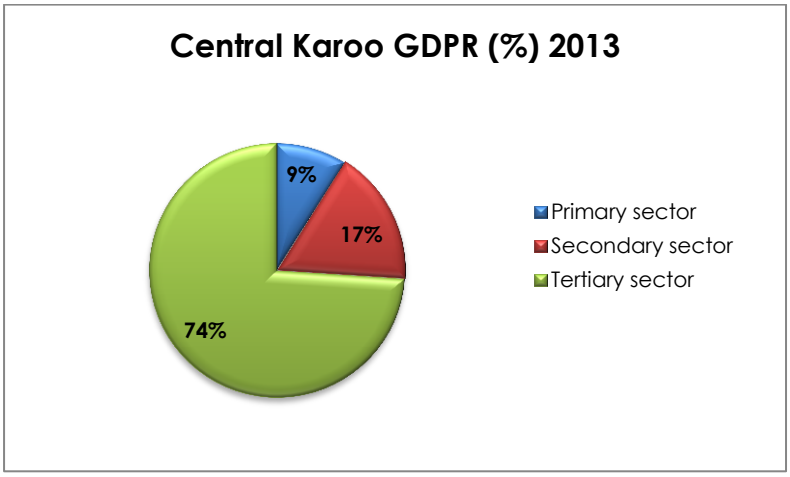


Figure 33: Sectors contributing to GDPR (MERO, 2014)

The detailed sector contributions to the Central Karoo GDPR are shown below.

Primary Sector	Agriculture; Forestry & Fishing (8.7%); Mining & Quarrying (0.1%); Water (5.7%)
Secondary Sector	Food, Beverages & Tobacco(3.7%); Textiles, Clothing & Leather Goods (0.5%); Wood, Paper, Publishing & Printing(0.2%); Petroleum Products, Chemicals, Rubber & Plastic (1.2%); Other Non-Metal Mineral Products(1.4%); Metals, Metal Products, Machinery & Equipment(1.5%); Electrical machinery & Apparatus (1.3%); Radio, TV, Instruments, Watches & Clocks (0.3%); Furniture & other manufacturing (0.4%); Electricity (0.9%); Construction (5.7%)
Tertiary Sector	Transport Equipment (0.5%); Wholesale & Retail Trade (12.1%); Catering & accommodation Services (1.7%); Transport &Storage(8.4%); Communication (3.0%); Finance & Insurance (10.8%); Business Services (17.8%); Community, Social & Personal Services (6.2%); General Government(13.4%)

4.5.2.6 Transport Infrastructure

The major road infrastructure is two national roads, the N1 and the N12, which traverses the municipality. See Figure 29.

4.5.2.6.1 Main transport corridors

The N1 national road bisects the district and is a key transport corridor for road-based freight transport, passenger services and private vehicles. The long-distance main railway runs parallel to the N1 through the district and connects Cape Town to Johannesburg/Pretoria as well as other main urban centres of South Africa. The N12 connects to the N1 south of Beaufort West and links to Oudtshoorn and George.

4.5.2.6.2 Principal Roads

The N1 national road runs through the district and is a vital link that bisects South Africa on a northeast-southwest axis, providing access to and between Limpopo Province, Gauteng, the Free State and the Western Cape. It links the towns of Beaufort West, Leeu-Gamka, Laingsburg and Matjiesfontein. The proclaimed provincial roads make up the bulk of roads between towns in the Central Karoo. The R63 truck road connects to the N1 in the northeast of the areas and passes to the south through Murraysburg and on to Graaff-Reinet, and to the north, to Victoria West in the Northern Cape. The R407 connects Prince Albert with the N1 in the north at Prince Albert Road, and connects with the N12 in the south. The R309 (Vleiland Road) to Seweweekespoort, which connects to Calitzdorp, is a vital link between Laingsburg and the R62.

4.5.2.7 Development profiles

Residential, commercial and industrial developments have an impact on the amount and types of waste generated as well as the different kinds of waste management services required within a municipal area. In order to facilitate integrated waste management planning, municipalities need to have a good understanding of the developmental and infrastructural needs within the municipal area. This together with the demographics of the municipal area is required for projecting current and future waste quantities. This section provides information on housing backlogs and delivery programmes for the Central Karoo District Municipality and has been sourced from the 2014/15 IDP Reviews for the district and local municipalities as well as housing demand and delivery information sourced from the Western Cape Government: Department of Human Settlements.

4.5.2.7.1 Housing type

The inhabitants of the CKDM reside in a variety of housing types or dwellings. Statistics South Africa (Census 2011) defines the three main dwelling types as follows –

- Formal dwellings include a house or brick/concrete structure on a separate stand or yard or on a farm, flat or apartment in a block of flats, cluster house in a complex, townhouse (semi-detached house in a complex), semi-detached house, house/ flat/ room in a backyard and a room/ flatlet on a property or a larger dwelling/ servants' quarters/ granny flat;
- Informal dwellings include a backyard shack, a shack not in a backyard but in an informal/ squatter settlement (informal residential) or on a farm; and
- Traditional dwellings include huts and structures made of traditional materials such clay, mud, reeds or other locally available natural materials e.g. homesteads/ rondavels.

Figure 34 depicts the dwelling type and indicates the quality of housing in relation to human settlements. The majority of households in the CKDM are in formal dwellings (98%) and 2% in informal and traditional dwellings.

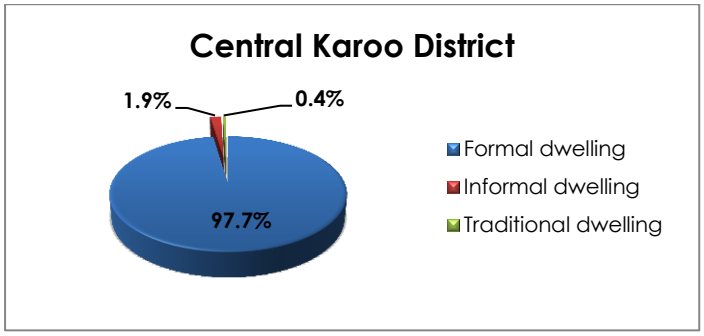


Figure 34: Access to housing

4.5.2.8 Housing demand and delivery

The Western Cape Department of Human Settlements (Raynita Robertson perscomm, 2015) highlights that Housing Demand databases within municipalities often include registered persons who may be residing within one District but have opted to register for a house in a different District. Figure 35 depicts the number of registered persons (7 159) on the Central Karoo Housing Demand database. The Beaufort West Municipality has the greatest number of persons (5 305) registered on the Housing Demand database with the lowest number of registered persons (594) in the Laingsburg Municipality (Figure 35).

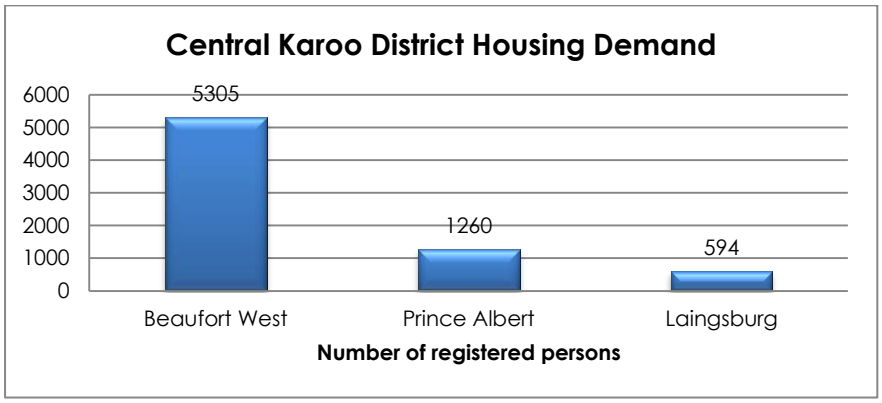


Figure 35: Housing Demand (as at July 2015)

Figure 36 depicts the estimated housing that can be delivered between 2009 and 2015 based on the available Division of Revenue Act (DORA) allocation and it also shows the potential housing that can be delivered between 2016 and 2021 with consideration for DORA allocation as well as project readiness. The project readiness is based on the following:

- Land obtained
- EIA Authorisation
- Consideration for bulk capacity
- Department of Human Settlements Approval
- Council Approval

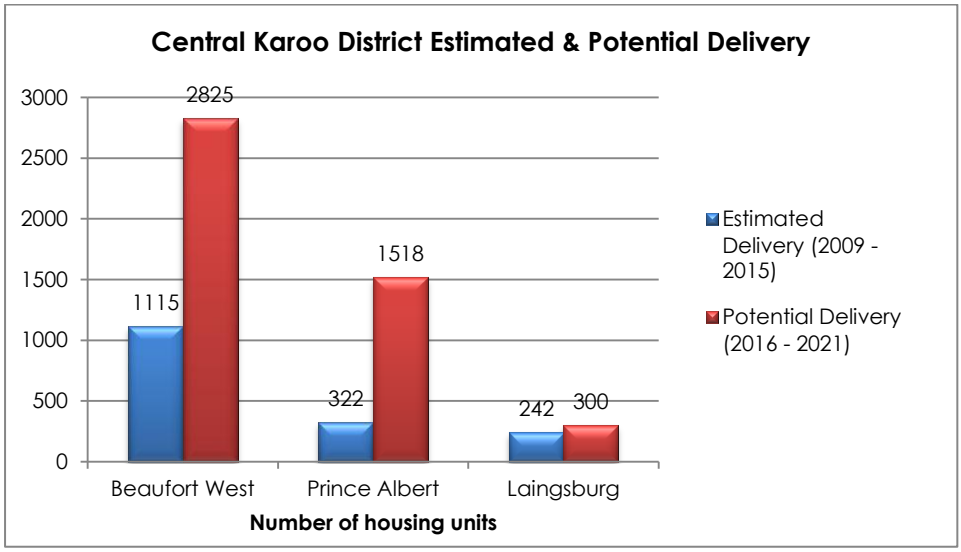


Figure 36: Estimated & Potential Housing Unit Delivery

Table 21: Housing Backlog and IDP Projects (IDP Review, 2014/15)

Municipality	Housing Backlog (units)	Housing projects	Budgeted/ Estimated Cost
Beaufort West	5 221 (Subsidy housing) 275 (GAP housing)	235 units	DHS
Laingsburg	No clear indication	349 units	R 14 520 000 (2015/16)
Prince Albert	1 514 units	GAP & Low cost housing	R26 900 000

The municipal IDP Reviews (2014/15) highlights the following challenges regarding housing backlogs:

- Prince Albert Municipality is in the process of drafting a Human Settlement Plan to set out the processes and procedures that need to be followed when selecting beneficiaries for new housing projects.

4.5.2.9 Housing delivery and Service levels

This section focuses on how the current and future housing status will affect the provision of the waste collection service. The CKDM service levels data used in this section, basic services (98%) and free basic services (100%), was obtained from the Department of Local Government and provides the status of service levels as at June 2015. The data, however, does not provide specifics with respect to service provision to informal dwellings, particularly informal settlements.

Beaufort West

The service levels for Beaufort West are at 100% for both basic and free basic services as at June 2015. The municipality had the highest number of registered people (5 305 as at July 2015) on the housing demand database and it also had the highest estimated housing delivery (1 115, between 2009 and 2015) as well as the highest potential housing delivery (2 825, from 2016 to 2021) of all the municipalities within the CKDM. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

Laingsburg

The service levels for Laingsburg are at 100% for both basic and free basic services as at June 2015. The municipality has 594 people registered on the housing demand database (as at July 2015). The estimated housing delivery between 2009 and 2015 was 242 and the potential housing delivery from 2016 to 2021 is 300. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

Prince Albert

The service levels for Prince Albert are at 100% for both basic and free basic services as at June 2015. The municipality has 1 260 people registered on the housing demand database (as at July 2015). The estimated housing delivery between 2009 and 2015 was 322 and the potential housing delivery from 2016 to 2021 is 1 518. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

All the local municipalities within the CKDM either provide a communal waste collection service (i.e. skips) and others provide a bag containment service in informal settlements. In formal dwellings, a bag containment is usually provided in low income housing and a wheelie bins to middle or high income housing. An upgrade from communal waste collection to the provision of bags or from a bag containment service to the provision of wheelie bins may be useful.

Municipalities are faced with the challenge of increasing informal settlements and as a result are struggling to meet the demand for delivery of low income housing. The National Department of Human Settlements has the Upgrading Informal Settlements Programme (UISP), which is an initiative to aimed at upgrading informal settlements through various grants. The UISP aims to provide and improve basic services to informal settlements as well as provide secure tenure to ensure that informal settlements are in well-located and legal land. The provision of basic services includes the upgrade of a communal waste collection service to a household refuse collection or the provision of a bag containment service.

4.5.3 Waste generation areas

4.5.3.1 General waste

Waste generation rates vary between municipalities and the following rates, as reflected in the local municipal IWMPs were used.

- Laingsburg Local Municipality – 0.85kg/c/day
- Prince Albert Local Municipality – 0.63kg/c/day
- Beaufort West Local Municipality – 0.57kg/c/day

Based on the above rates it is estimated that waste generation figures in CKDM, using the 2011 population figures as the baseline, will increase by 4.3% by 2020, 12.8% by 2030 and 19,4% by 2040. The projected general waste generation figures include domestic, commercial and industrial waste.

Figure 37 depicts waste generation quantities for CKDM for the years 2011 to 2040. These are relatively low due to the district's low population.

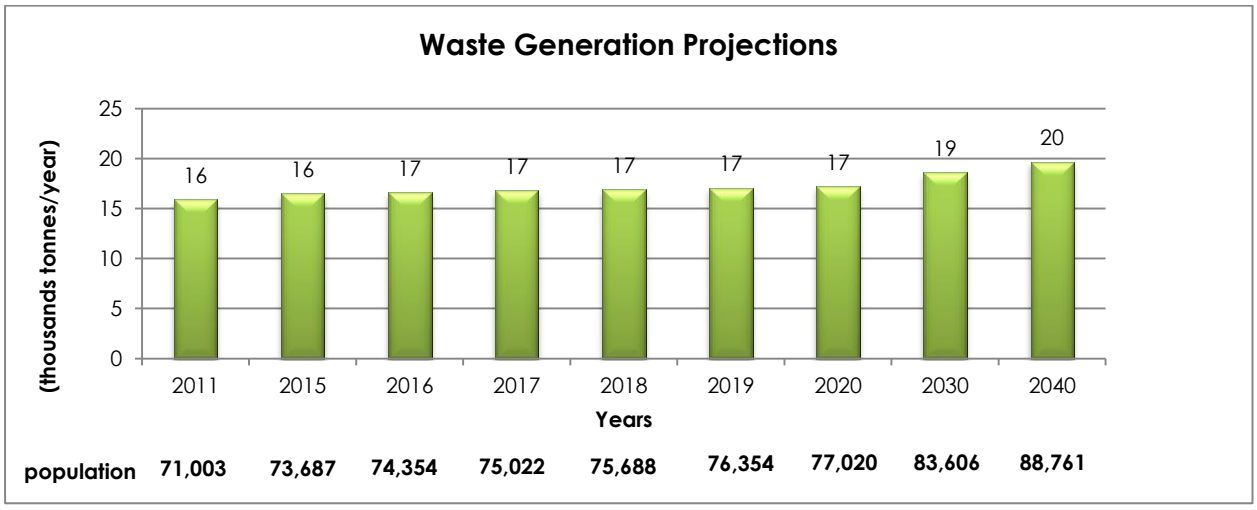


Figure 37: Waste generation quantities 2011 – 2040

4.5.3.2 Waste composition

4.5.3.2.1 General waste

The Department conducted waste characterisation studies in Beaufort West, Laingsburg and Prince Albert between 2012 and 2014. A sample size of 500 bags per municipality was used to characterise the waste. The sampling was spread across each municipality and was concentrated in those towns and residential areas with the highest number of households. The results of the study were also compared with the study conducted in 2007.

The dominant waste streams during the 2007 study were paper and cardboard (28%), plastics (28%) and organics(14%). These results are comparable with the 2012 to 2014 studies conducted with paper and cardboard (25%), plastics (23%) and organics(25%).

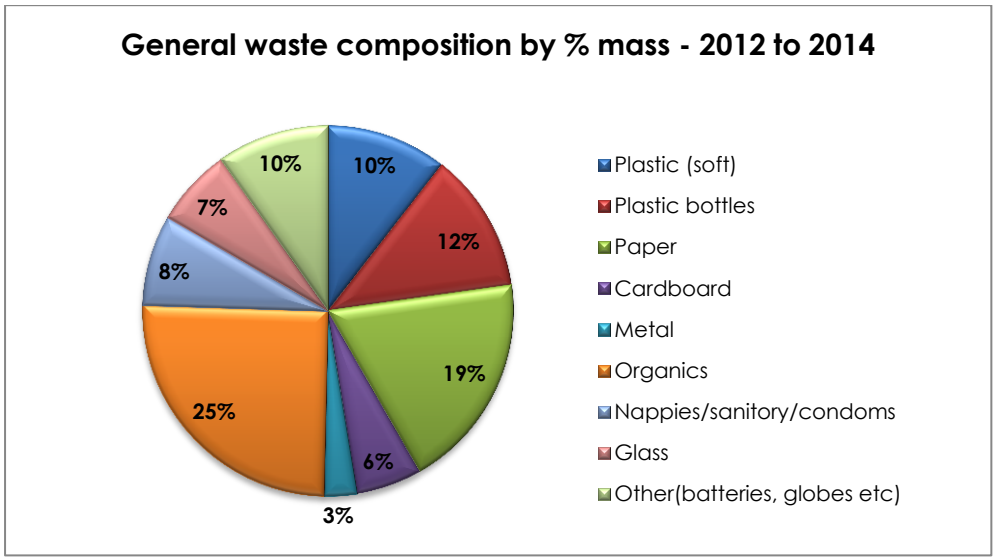


Figure 38: Waste composition by % mass

4.5.3.3 Health care risk waste

The Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007) defines Health Care Risk Waste (HCRW) as that portion of health care waste that is hazardous and includes infectious waste, pathological waste, sharp waste, pharmaceutical waste, genotoxic waste, chemical waste, waste with heavy metals, radioactive waste, and any other health care waste which is defined as hazardous in terms of the Waste Management Series: Document 1: Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, as published by the Department of Water Affairs and Forestry.

HCRW is either incinerated as a means of disposal or treated through Electro Thermal Destruction. Incineration of HCRW is one of the most effective means to eliminate the risks posed by health care risk waste and also reduces the overall volume of the waste. HCRW is mainly removed to be treated and disposed by service providers who have to be registered on the Western Cape Integrated Pollutant and Waste Information System (IPWIS) as required in terms of the National Environmental Management: Waste Act: National Waste Information Regulations, January 2013. The HCRW Generators are also required to register and report to the provincial IPWIS, which then exports the data onto the national waste information system (SAWIS).

According to the IPWIS (October 2015), 24 governmental, non-governmental and private healthcare facilities within CKDM have registered and 9 are reporting on the provincial system to date. Table 22 depicts the number and types of healthcare facilities available across CKWM.

Table 22: Healthcare facilities

Community health centres	Community day centres	Number of PHC clinics - fixed	Number of PHC clinics - non-fixed (satellites)	Number of PHC clinics - non-fixed (mobiles)	Number of district hospitals	Number of regional hospitals	Total
0	1	8	3	8	4	0	**24**

Source: WCG Provincial Treasury - Socio-economic Profile 2014 Working paper

The amount of HCRW reported on the IPWIS for the period January 2014 to August 2015 amounted to 194 tonnes. Figure 39 provides the percentage distribution of HCRW across CKDM.

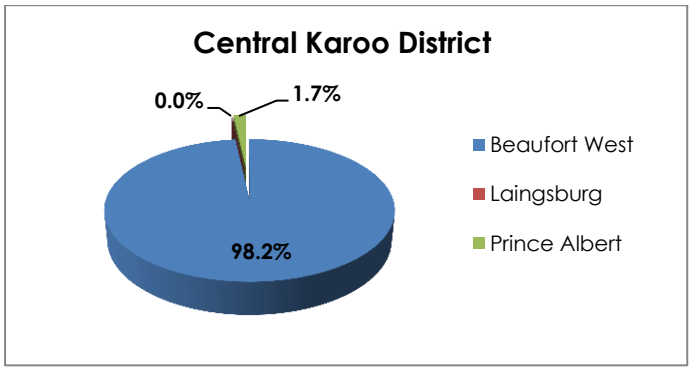


Figure 39: Healthcare risk waste percentage distribution

4.5.3.4 Hazardous Waste

Nothing reported in the municipal IWMPs.

4.5.3.5 Problem waste streams

4.5.3.5.1 Agricultural waste

The main agricutural commodity in the district is grapes. There is a domination of grapes for wine, although increasingly table grapes are being planted. Cereals and fruit, both pome and stone, are the remaining dominant sectors[41].

There is a lack of information on the liquid and solid waste from the winemaking process.

4.5.3.5.2 Sewage sludge

Table 23 depicts sewage sludge management in the CKDM.

Table 23: Wastewater Treatment Works and sewage sludge disposal

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Prince Albert	Klaarstroom	Sludge quantities unknown	Sludge is manually removed by handmade tools and safely disposed of in trenches on site.
	Leeu-Gamka	Sludge quantities unknown	
	Prince Albert	Sludge quantities unknown	
Laingsburg	Laingsburg	No information received	Funds are being sourced to establish drying beds, which will be used to store sludge. Currently the sludge is kept in ponds.
	Matjiesfontein Village	Sludge quantities unknown	Anaerobic ponds are cleaned annually and sludge is buried on site.
Beaufort West	Merweville	No sludge generated yet. Oxidation ponds with very low inflows.	No sludge generated yet. Oxidation ponds with very low inflows.
	Beaufort West	15000m^3 stored in lagoon (20 year period)	Sludge is stockpiled on site and then given to different users to be used as compost.
	Nelspoort	Sludge quantities unknown	In the process of drying the oxidation ponds, which will help determine which method can be used to dispose of sludge.
	Murraysburg	Sludge quantities unknown	Oxidation ponds have not been de-sludged.

[41] Western Cape Government: Water Infrastructure & opportunities for agriculture & agri-processing in the Western Cape (2015)

4.5.3.5.3 Abattoir waste

The following information was obtained regarding management of abattoir waste in CKDM.

Table 24: Abattoir waste

Municipality	Number of abattoirs	Disposal methods	Disposal quantities
Prince Albert	1	The facility has only started to function recently under new management. The municipality has no information at this stage.	Unknown
Laingsburg	1	There is no agreement between the municipality and the abattoir for the disposal of abattoir waste as they dispose of their own waste.	Unknown
Beaufort West	3`	Trench method is used at Vaalkoppies WDF as part of an interim agreement.	43.65 tonnes (September – December 2015)

4.5.3.5.4 Tyres

Handling of tyre waste and quantities are unknown due to limiting reporting from industries.

4.5.4 Waste avoidance, reduction and recycling

4.5.4.1 Waste avoidance and recycling[42]

The district does not co-ordinate any waste minimisation initiatives but has initiated an Environmental Forum where all pertinent waste management issues are discussed and addressed.

4.5.4.1.1 Beaufort West Municipality

Waste awareness

- Minimal signage is visible in the city centre areas.

Waste minimisation

- A split bag system is being implemented in the municipality for the responsibility of the supported recycler.
- The municipality supports material recovery by supporting a private recycling business.

Job creation

- The municipality implements the food for waste project.
- Youth Jobs in Waste workers were employed by the municipality.

4.5.4.1.2 Laingsburg Municipality

Waste awareness

- There has been no further waste awareness due to the termination of Youth Jobs in Waste programme. This contract has subsequently been renewed and community awareness programmes are planned for the new year. Waste awareness signage are present on waste bins in the town centres.

Waste minimisation

- The waste minimisation programme was terminated due to lack of resources. A new service provider has been appointed and will start a waste recovery programme shortly.

Job creation

- Youth Jobs in Waste workers are employed by the municipality with the assistance of DEA but they have not been utilised effectively in waste awareness initiatives.

[42] Greenest Municipality Competition: Waste Management Report 2015/2016

4.5.4.1.3 Prince Albert Municipality

Waste awareness

- TEDCOR workers are appointed in the municipality to assist with waste awaress raising.

Waste minimisation

- The municipality implements the Pick-a-Piece project that operates on the swop shop concept.

Job creation

- Youth Jobs in Waste workers are utilised to raise awareness.

4.5.4.2 Waste information[43]

4.5.4.2.1 Beaufort West Municipality

Information was received by the Department although some information is still outstanding. The Municipality has a reporting rate of 33%.

4.5.4.2.2 Laingsburg Municipality

Waste information is reported, however, there is a need for training on the capturing and reporting of accurate information to the Department.

4.5.4.2.3 Prince Albert Municipality

Waste information was received by the Department. However the compliance rating for this section is at 17%.

[43] Greenest Municipality Competition: Waste Management Report 2015/2016

4.5.5 Treatment and disposal

Figure 40 depicts compliance scores at WMFs that were audited in the 2015/16 financial year. Key challenges experienced at the WMFs are lack of cover material, windblown litter, fencing, storm water management, limited machinery and component security and operational staff. Burning of waste takes place at most facilities. All WDFs in CKDM yielded red ratings (0 -64%). These facilities will receive priority for the 2016/17 financial year.

Compliance scores ratings:

Total	Status Indicator		Action
85 – 100 %	Green	X	Small changes needed
65 – 84 %	Amber		Improvements required
0 – 64 %	Red		Major improvements required

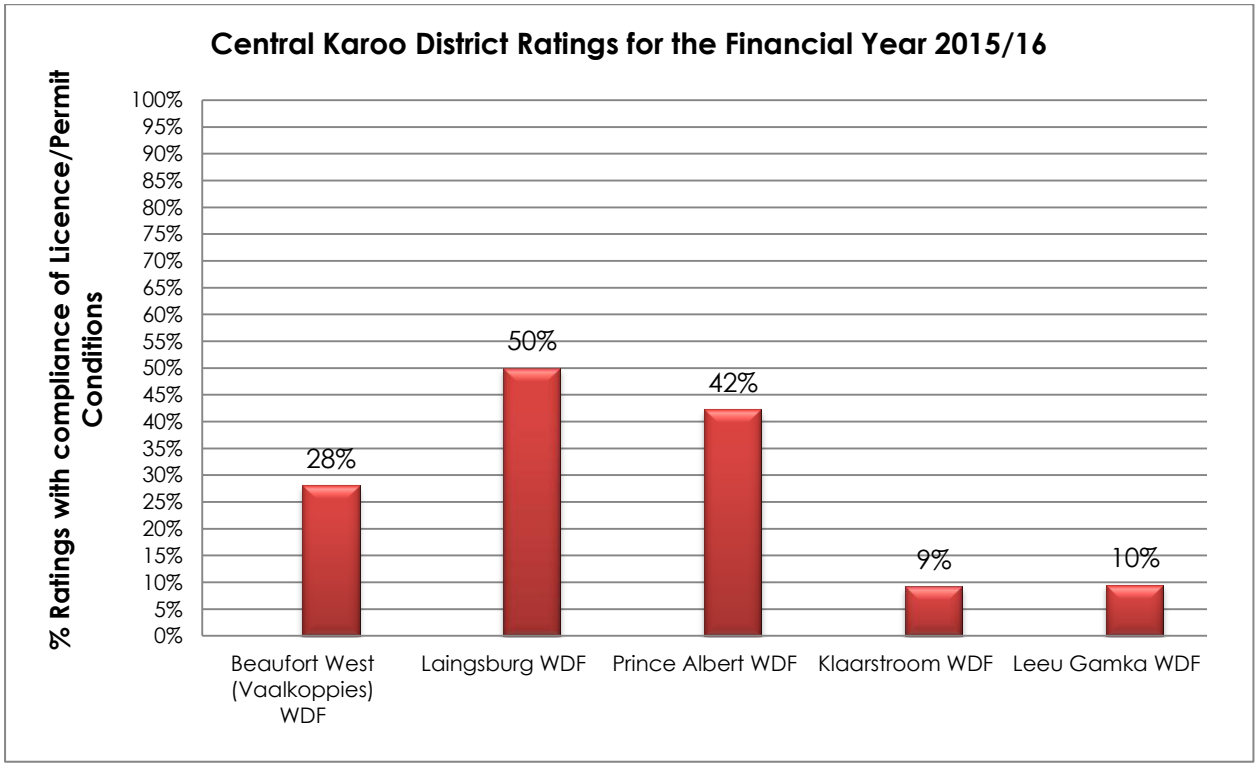


Figure 40: Compliance audit outcomes of Waste Management Facilities

The status quo of waste management facilities in CKDM is provided in Table 25.

It should be noted that the facilities in the Table 25 with decommission licence type statuses isssued in 2014/15 fiscal year are issued with licence conditions to commence with decommissioning within a 5 year period. This condition was implemented to allow the Municipalities to plan and prepare alternatives for the closure of the waste disposal facilities..

Table 25: Conditions of Waste Management Facilities

Munipalities	Waste Management Facility	Classification	Licence type	Available airspace incl years	Types of waste
Prince Albert	Prince Albert WDF	G:C:B-	Operation	Full capacity by 2015	Green waste, garden waste & building rubble
	Klaarstroom WDF	G:C:B	Decommission	Capacity up till 2025	General waste
	Leeu Gamka WDF	n/a	Decommission	It has reached capacity in 2013	Household, garden waste & building rubble
Beaufort West	Merweville WDF	G:C:B-	Operation licence in process	Approximately 10 years (2014 report)	General waste
	Nelspoort WDF	G:C:B-	Operation	± 30 years (2015 data)	Unknown
	Vaalkopies WDF	G:C:B-	Operation	Approximately 10yrs (2015 data)	Unknown
	Murraysburg WDF	G:C:B-	Operation	Unknown	Household & garden waste
Laingsburg	Laingsburg WDF	G:C:B-	Operation	Approximately 10yrs (2015 data)	Garden refuse, building rubble & general domestic waste

4.5.6 Regionalisation of waste management

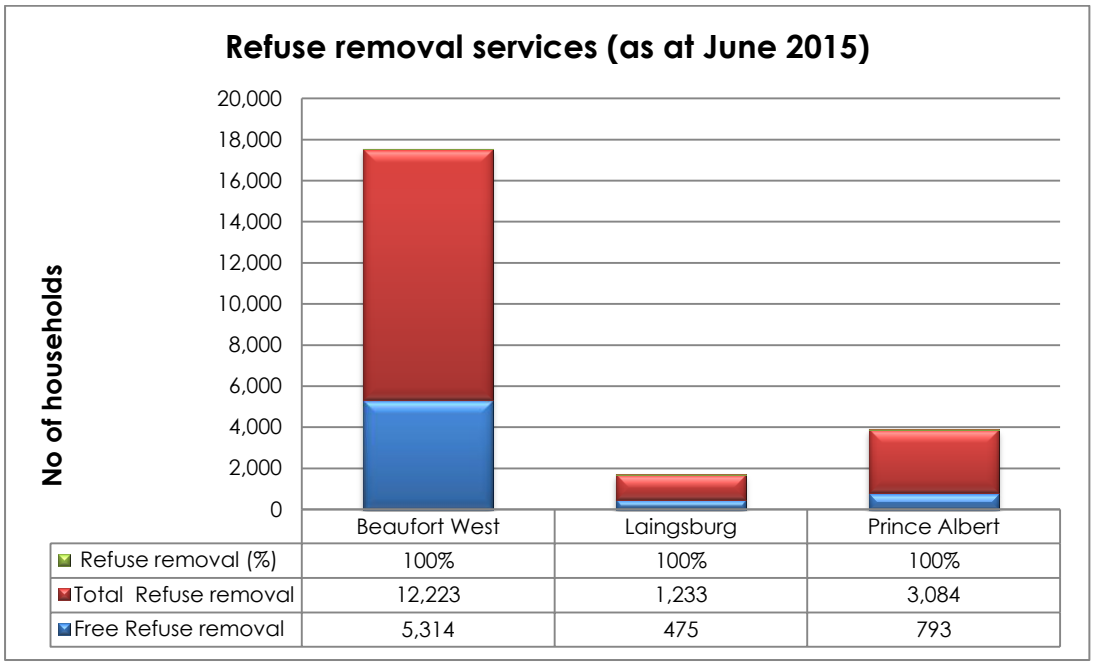
The CKDM does not have any plans for a regional waste management facility.

4.5.7 Current and upcoming alternative waste treatment options

There are currently no upcoming alternative waste treatment options planned in the district.

4.5.8 Status of waste collection services

Figure 41 depicts the level of domestic waste collection services in CKDM as at June 2015 it is noted that all households (formal and informal)are being serviced by the local municipalities.



	Beaufort West	Laingsburg	Prince Albert
Refuse removal (%)	100%	100%	100%
Total Refuse removal	12,223	1,233	3,084
Free Refuse removal	5,314	475	793

Figure 41: Refuse removal services as at June 2015 (Source: Provincial Treasury, 2015)

4.5.8.1 Public cleansing and illegal dumping

Littering and illegal dumping occur throughout the urban areas in the district with a prominent occurrence of illegal dumping in Beaufort West. The illegal dumping of waste as well as the insufficient and irregular removal of waste within the residential areas are one of the biggest nuisances in the communities. Municipalities in CKDM have limited resources to ensure that all areas prone to illegal dumping are cleaned up at all times.

4.5.9 Cost of existing waste management system

Section 74(1) of the Municipal Systems Act (Act No. 32 of 2000) requires municipal councils to adopt and implement a tariff policy on the levying of fees for municipal services provided by the municipality or through service delivery agreements. The tariff structure for CKDM is depicted in Table 26.

Table 26: Tariff structure

Municipality	Service: Refuse Removal	Cost range
Prince Albert	Residential, Businesses and Garden refuse	R47.45 - R128.66
Beaufort West	Residential, Businesses, Garden refuse and National Park general waste	R15.75 - R273.00
Laingsburg	Residential, Businesses, Garden refuse, Compost containers, Black bags and extra removal	R1.98 - R336.30

The ranges in tariff structure within the district are based on income levels and dwelling types as they are catered for each town within the LMs. The tariffs are either measured on the Rands per load (in the case of garden refuse), Rands per bag (in the case of black bags), on a monthly or annual basis for 85 litre bins (see Prince Albert, Beaufort West & Laingsburg IWMPs for specific tariffs.

Municipal Infrastructure Grant (MIG) funded projects identified in the 2014/15 IDPare as follows:

Table 27: MIG funded capital projects 2014/2015

Municipality	Project Name	Ward Capital	Amount		
			2014/15	2015/16	2016/17
Beaufort West	Refuse Transfer Station Phase II				R1 500 000
Beaufort West	New Refuse Transfer Station			R228 259	
Prince Albert	Rehabilitation solid waste disposal site	2,3,4	R500 000		

In addition to the above, numerous attempts were made to obtain financial information around solid waste management from most local municipalities, however, this has been unsuccessful, with the exception of a few. Consequently, DEADP obtained financial OPEX and CAPEX (audited) for all local municipalities from Provincial Treasury. It should be noted that these are financial summaries of waste management services.

Table 28: CAPEX for CKDM (2011/12 – 2014/15)

CAPEX	*2011/12*	*2012/13*	*2013/14*	*2014/15*
R(thousands)	*Audited Outcome*	*Audited Outcome*	*Audited Outcome*	*Pre-audit Outcome*
Beaufort West	90	374	1 462	130
Prince Albert	Unknown	Unknown	Unknown	Unknown
Laingsburg	Unknown	Unknown	Unknown	Unknown
Total	90	374	1 462	130

Source: Provincial Treasury

Table 29: OPEX Revenue for CKDM (2011/12 – 2014/15)

OPEX- Revenue	*2011/12*	*2012/13*	*2013/14*	*2014/15*
R(thousands)	*Audited Outcome*	*Audited Outcome*	*Audited Outcome*	*Pre-audit Outcome*
Beaufort West	5 339	6 457	6 935	7 433
Prince Albert	828	919	1 998	2 050
Laingsburg	1 308	1 533	Unknown	1 634
Total	7 475	8 908	8 933	11 117

Source: Provincial Treasury

Table 30: OPEX Expenditure for CKDM (2011/12 – 2014/15)

OPEX-Expenditure	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Beaufort West	7 789	8 000	10 411	12 302
Prince Albert	Unknown	Unknown	1 717	1 425
Laingsburg	1 017	1 418	Unknown	1 271
Total	8 806	9 418	12 128	14 998

Source: Provincial Treasury

Figure 42 shows the OPEX Revenue vs OPEX Expenditure for waste management services in the various local municipalities. The Prince Albert and Laingsburg local municipalities generate more revenue than their expenses. Beaufort West municipality has a deficit of almost R5 million.

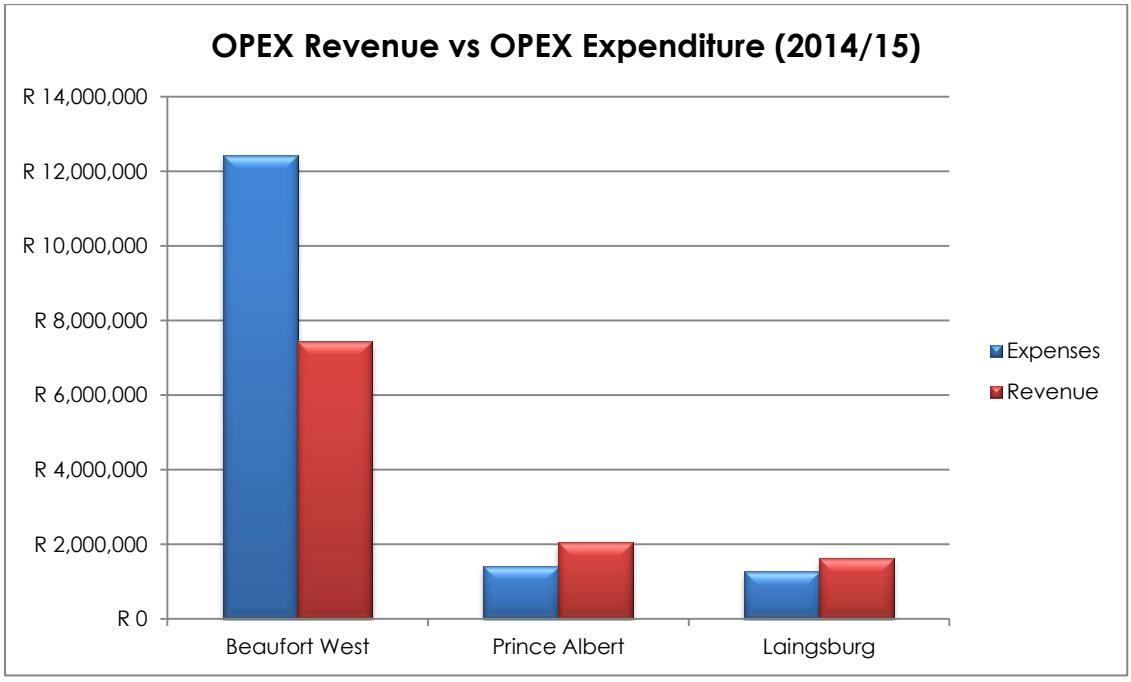


Figure 42: OPEX Revenue vs OPEX Expenditure: 2014/15 (Source: Provincial Treasury, 2014/15)

4.5.10 Governance

The District does not have a designated WMO but has established an Environmental Forum which also focuses on waste related issues. The organisational structure for the various municipalities are depicted in Table 31.

Table 31: Organisational structure

	Laingsburg	*Prince Albert*	*Beaufort West*
Dept responsible for waste management	Technical Services	Solid Waste Services	Community Services
Designated WMO	No	No	No
Vacancies	Unknown	Unknown	Unknown
Staff training and development	Unknown	Unknown	Unknown
Waste policy & by-laws aligned with Waste Act & NWMS	Municipality does not have a Waste By-law	Municipality does not have a Waste By-law	Waste by-is outdated (2005) and is not aligned with the Waste Act
Private sector involvement (collection, disposal, waste minimisation)	Unknown	Unknown	Unknown
CBOs &NGOs interested in waste field	Unknown	Unknown	Unknown

Source: Local Municipalities, 2015

4.6 EDEN DISTRICT MUNICIPALITY

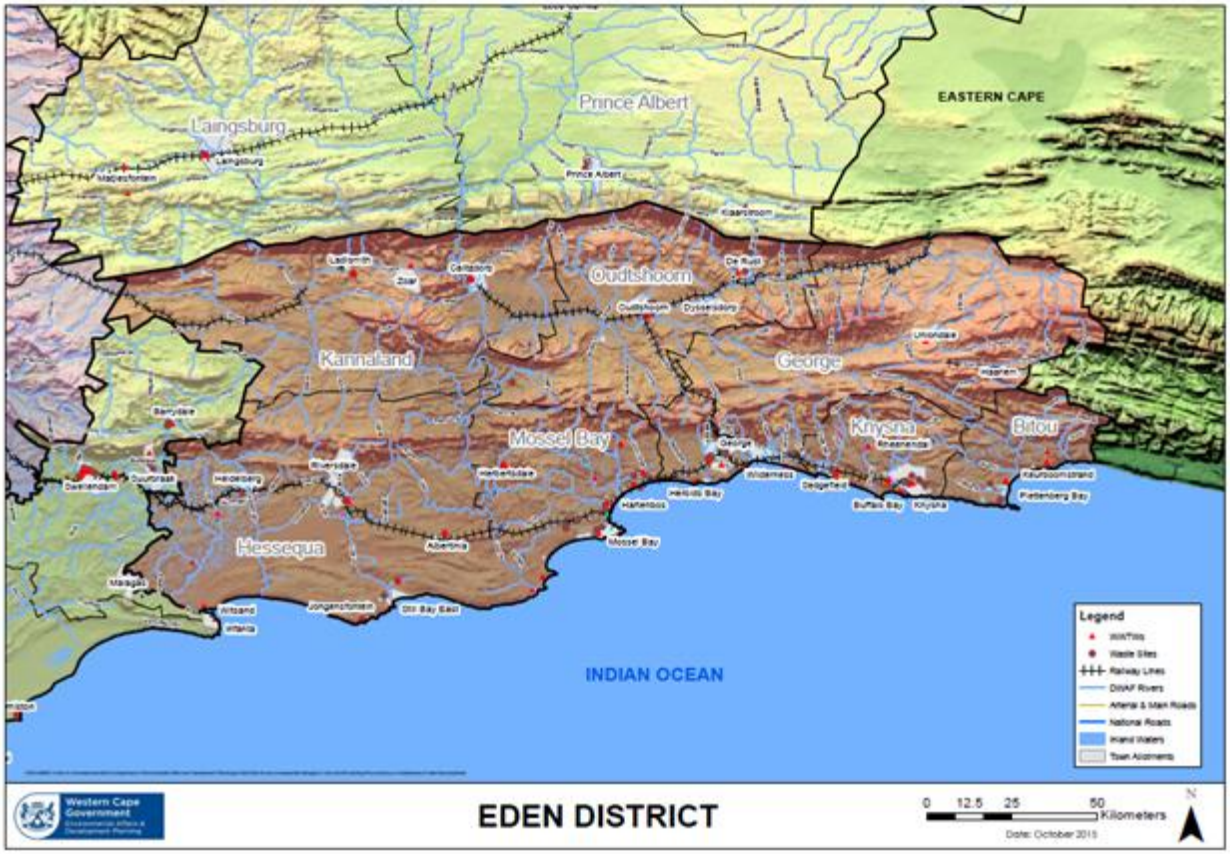


Figure 43: Geographical area of Eden District Municipality

4.6.1 Geographical Area

The Eden District Municipality (EDM) is located along the south-eastern coast of the Western Cape Province and is neihgboured along the coast by the Overberg District and the Eastern Cape. The District covers an area of 23 330 km^2 . The northern boundary of EDM is formed by the Klein and Groot Swartberg Mountain ranges from the town of Anysberg in the northwest to Toorwater in the northeast. Seven municipalities, namely Oudtshoorn, Kannaland, Mossel Bay, George, Hessequa, Knysna and Bitou make up the district. The Garden Route forms the centre of the regions tourism industry. The district is endowed by rich natural resources and landscapes, the most prominent of which are associated with the coastal zone, the indigenous forests on the coastal plateaux and the Klein Karoo. The district has warm summers and mild to chilly winters. It is one of the highest rainfall regions in South Africa with most rain falling in the winter and spring months.

4.6.2 Demographics

This section provides the socio-economic characteristics of the population within the EDM based on statistical data for factors such as population, economic status, level of education, income level and employment status. Where no waste quantities are available, population and socio-economic status data can be used to estimate current and future waste quantities generated within the district.

4.6.2.1 Current population and growth estimates

Table 32 depicts the poulation growth in EDM and serves as an indication of demand for service delivery provision, which includes integrated waste management services.

Table 32: Population growth (2001 – 2011)

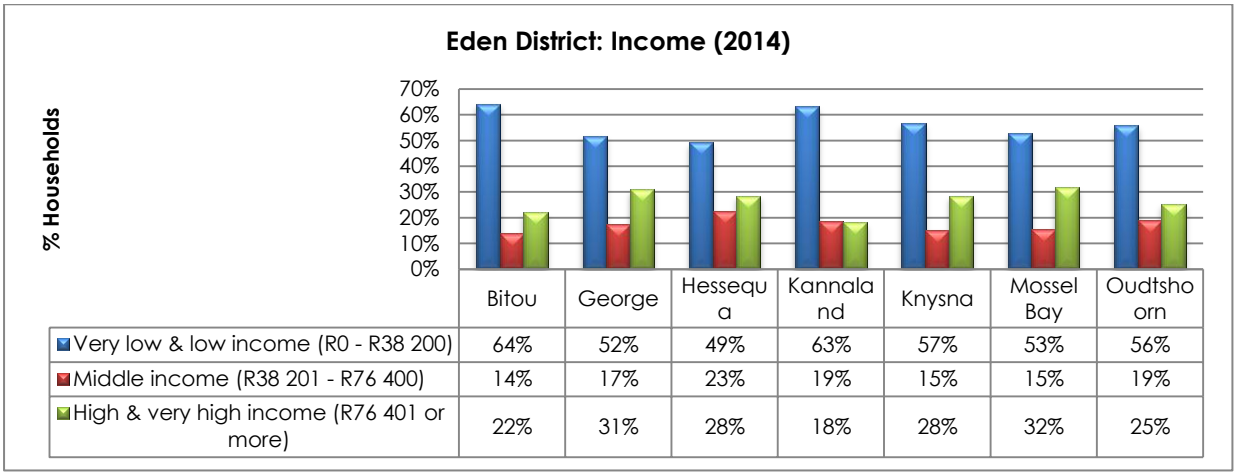
Municipality	2001	2011	Average annual growth (%)
Kannaland	23,975	24,767	0.3
Hessequa	44,108	52,642	1.8
Mossel Bay	71,498	89,430	2.3
George	135,402	193,672	3.6
Oudtshoorn	84,691	95,933	1.3
Bitou	29,180	49,162	5.4
Knysna	51,475	68,659	2.9
Eden	**440,329**	**574,265**	**2.5**

(Source: STATS SA)

The district has grown at a rate of approximately 2.5% between 2001 – 2011. The Bitou Municipality experienced the highest growth (5.4%) with Oudtshoorn and Kannaland Municipalities at the lowest growth rates of 1.3 % and 0.3% respectively. Population growth in the EDM implies an increase in waste generation between 2001 and 2011.

4.6.2.2 Household income levels

Figure 44 depicts the various income levels in EDM for 2014.



	Bitou	George	Hessequa	Kannaland	Knysna	Mossel Bay	Oudtshoorn
Very low & low income (R0 - R38 200)	64%	52%	49%	63%	57%	53%	56%
Middle income (R38 201 - R76 400)	14%	17%	23%	19%	15%	15%	19%
High & very high income (R76 401 or more)	22%	31%	28%	18%	28%	32%	25%

Figure 44: Household income levels, 2014 (Source: Provincial Treasury, 2014)

The majority of the households fall within the very low and low income group (R0 to R38 200). The Mossel Bay Municipality has the highest number of households within the high and very high income group (31%) closely followed by the George Municipality.

4.6.2.3 Employment[44]

Figure 45 depicts the distribution of skills levels in EDM for 2014. The employment status of the EDM indicates that the majority of employed people fall within the semi- and unskilled formal employment category (56 472), closely followed by the Skilled formal employment category at 55 901 and 22 814 people fall within the highly skilled formal employment category. The disparity between demand and supply for labour skills is indicated in the MERO studies and the MERO (2014) specifically highlights the oversupply of the semi- and unskilled employment category

[44] Highly skilled occupations include managers, professionals and technicians, semi-and unskilled labour include domestic workers and other elementary workers *and skilled all other occupations, e.g. clerks, sales & services, skilled agricultural workers, crafts, machine operators, etc.* (StatsSA Labour Force Survey, LFS and QLFS).

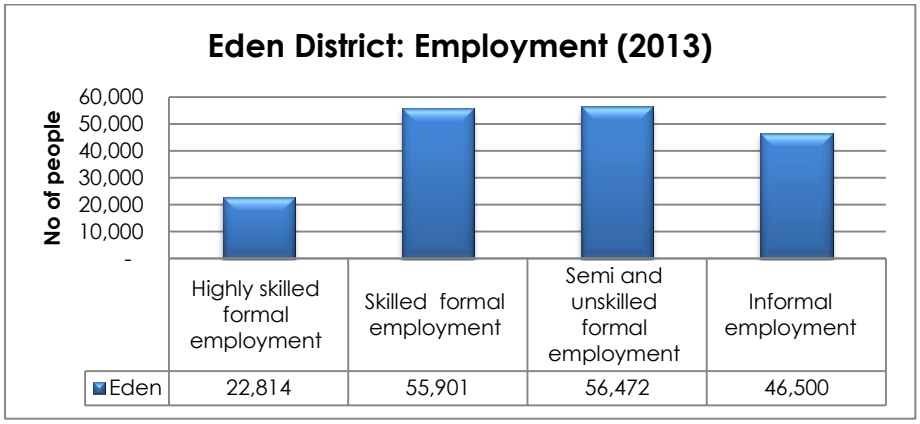


Figure 45: Employment 2013 (Source: MERO, 2014)

4.6.2.4 Level of education

The level of education is considered as an indicator of the potential for employability, although this will be influenced by employment opportunities available within the district based on growth and development potential in the area. Figure 46 depicts the level of education in the EDM for the years 2001 and 2011. The Regional Development Profile documents (WCG: Provincial Treasury, 2012) emphasise the importance of education in improving access to employment opportunities and in sustaining as well as accelerating economic growth. Most people have received secondary schooling and passed Matric/Grade 12 than have completed higher education within the EDM.

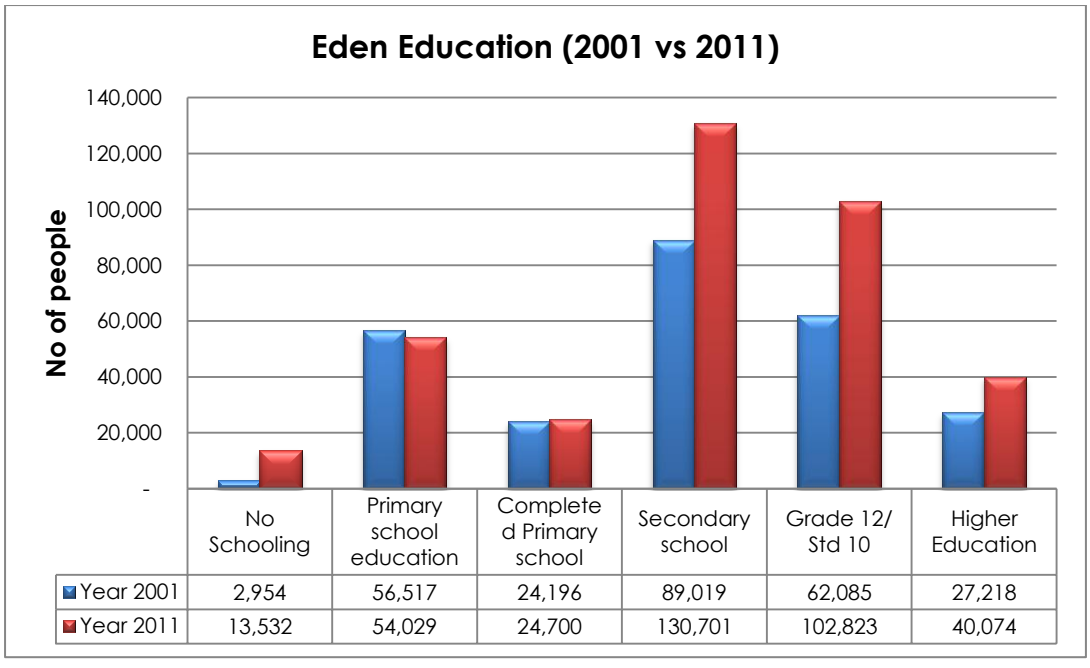


Figure 46: Education (2001 vs 2011)

4.6.2.5 Economic status

Figure 47 provide the real economic growth rate (percentage real GDPR growth) of the main sector for the EDM. The tertiary sector dominates in the district contributing to 68% of the GDPR. Dominant sectors are Business Services (18.1%), Wholesale & Retail Trade (15.3%) and General Government (12.6%). This gives an indication of the types of waste being generated within the district.

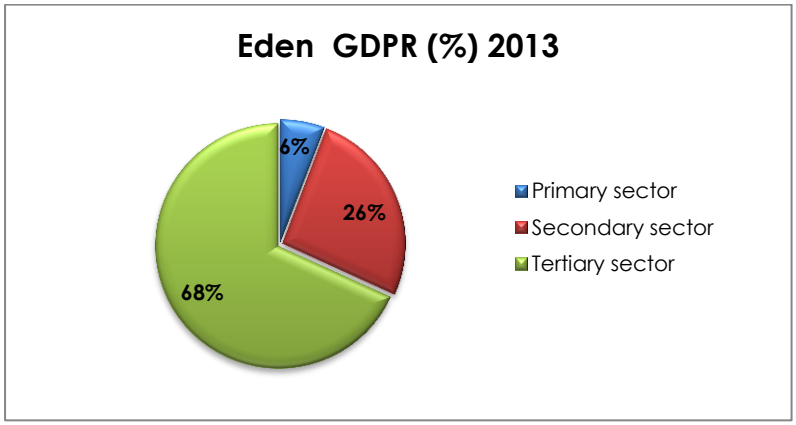


Figure 47: Sectors contributing to GDPR (MERO, 2014)

The detailed sector contributions to the Eden GDPR are shown below.

Primary Sector	Agriculture, Forestry & Fishing (5.3%), Mining & Quarrying (0.1%), Water (0.4%)
Secondary Sector	Food, Beverages & Tobacco (4.6%), Textiles, Clothing & leather Goods (0.7%), Wood, Paper, Publishing & Printing(1.4%), Petroleum Products, Chemicals, Rubber & Plastic (5.5%), other Non-Metal Mineral Products (0.8%), Metals, Metal Products, Machinery & Equipment (1.4%), Electrical machinery & Apparatus (0.3%),Radio, TV, Instruments, Watches & Clocks(0.1%), Furniture& Other manufacturing (1.4%), Electricity (1.1%), Construction (8.7%)
Tertiary Sector	Transport Equipment (0.9%), Wholesale& Retail Trade (15.3%), Catering and accommodation Services (2.6%), Transport & Storage (4.3%), Communication (3.1%), Finance & Insurance (6.0%), Business Services (18.1%), Community, Social and Personal Service (5.3%), General Government (12.6%)

4.6.2.6 Transport Infrastructure

The inland municipalities and coastal municipalities are divided by a number of mountain ranges. See figure Figure 43.

The major route through EDM is the N2 highway which connects Hessequa, Mossel Bay, George, Knysna and Bitou Municipalities. The major route through the Oudtshoorn Municipality is the R62 which connects Oudtshoorn with Kannaland to the west and George Municipality to the east (previously Eden DMA).The R328 and N12 connect Oudtshoorn to Mossel Bay and George respectively via the Robinson Pass and Outeniqua Pass (2nd generation IWMP, July 2013).

Currently, household waste is transported daily between Knysna and George to the site in Mosselbay. The George municipality has a strategy in place to pursue waste by rail as a key commodity (Growth Potential Study (GPS), 2014). According to the GPS (2014), the belief is that this will also open up opportunities for industry projects related to recycling and waste management.

4.6.2.6.1 Hessequa Municipality

Waste is generated in seven towns within the Hessequa Municipality, which are Riversdale, Stillbay, Heidelberg, Slangrivier, Witsand, Gouritsmond and Albertinia and all have licensed waste sites. The waste from Witsand is transported via the R322 to the Heidelberg site. Waste and recyclables from Stillbay are transported via the R305 to the Riversdale site. The waste from Gouritsmond is transported via the R325 and the N2, as well as waste from Albertinia also transported via the N2 to the Riversdale waste site.

4.6.2.6.2 Mosselbay Municipality

All municipal waste from Kwanonqaba, Sonskynvalley and Grootbrak is transported via the N2 to the PetroSA Landfill in Mossdustria. Most of the recycling routes are residential, but recyclables from Kleinbrak to Hersham is all transported via the N2 to the H:H site in Voorbaai.

4.6.2.6.3 George Municipality

Information not provided by municipality.

4.6.2.6.4 Oudtshoorn Municipality

Information not provided by municipality.

4.6.2.6.5 Kannaland Municipality

Information not provided by municipality.

4.6.2.6.6 Knysna Municipality

Information not provided by municipality.

4.6.2.6.7 Bitou Municipality

Information not provided by municipality.

4.6.2.7 Development profiles

Residential, commercial and industrial developments have an impact on the amount and types of waste generated as well as the different kinds of waste management services required within a municipal area. In order to facilitate integrated waste management planning, municipalities need to have a good understanding of the developmental and infrastructural needs within the municipal area. This together with the demographics of the municipal area is required for projecting current and future waste quantities. This section provides information on housing backlogs and delivery programmes for the Eden District Municipality and has been sourced from the 2014/15 IDP Reviews for the district and local municipalities as well as housing demand and delivery information sourced from the Western Cape Government: Department of Human Settlements.

4.6.2.6.8 Housing type

The inhabitants of the Eden District Municipality reside in a variety of housing types or dwellings. Statistics South Africa (Census 2011) defines the three main dwelling types as follows –

- Formal dwellings include a house or brick/concrete structure on a separate stand or yard or on a farm, flat or apartment in a block of flats, cluster house in a complex, townhouse (semi-detached house in a complex), semi-detached house, house/ flat/ room in a backyard and a room/ flatlet on a property or a larger dwelling/ servants' quarters/ granny flat;
- Informal dwellings include a backyard shack, a shack not in a backyard but in an informal/ squatter settlement (informal residential) or on a farm; and
- Traditional dwellings include huts and structures made of traditional materials such clay, mud, reeds or other locally available natural materials e.g. homesteads/ rondavels.

Table 52 depicts the dwelling types and indicates the quality of housing in relation to human settlements. The majority of households in the Eden District Municipality are in formal dwellings (85%) and 15% in informal and traditional dwellings.

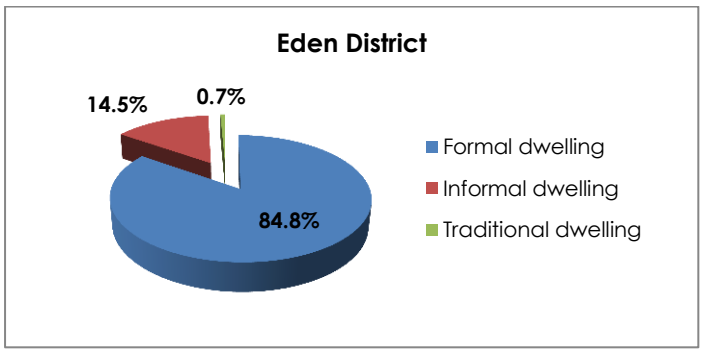


Figure 48: Access to housing

4.6.2.7 Housing demand and delivery

The Western Cape Department of Human Settlements (Raynita Robertson perscomm, 2015) highlights that Housing Demand databases within municipalities often include registered persons who may be residing within one District but have opted to register for a house in a different District. Figure 49 below depicts the number of registered persons (64 708) on the Eden Housing Demand database. The George Municipality has the greatest number of persons (17 265) registered on the Housing Demand database with the lowest number of registered persons (2 963) in the Kannaland Municipality (Figure 49).

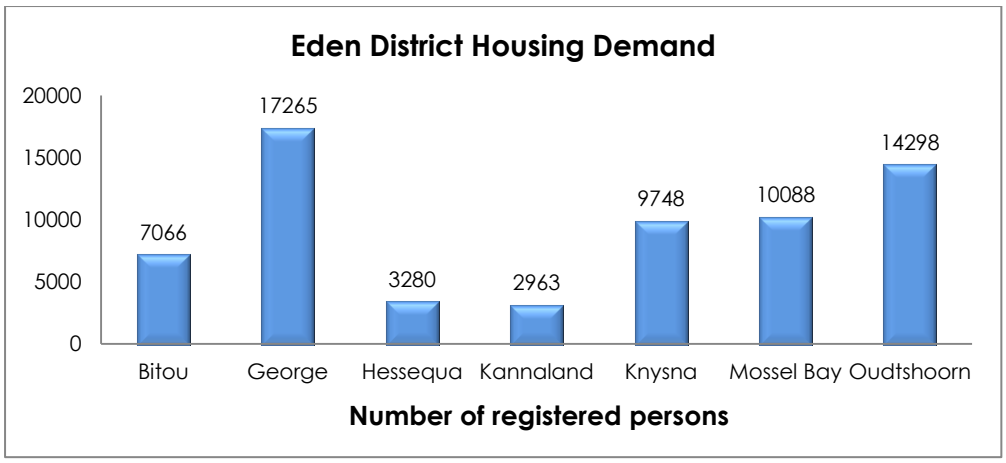


Figure 49: Housing Demand (as at July 2015)

Figure 50 depicts the estimated housing that can be delivered between 2009 and 2015 based on the available Division of Revenue Act (DORA) allocation and it also shows the potential housing that can be delivered between 2016 and 2021 with consideration for DORA allocation as well as project readiness. The project readiness is based on the following:

- Land obtained
- EIA Authorisation
- Consideration for bulk capacity
- Department of Human Settlements Approval
- Council Approval

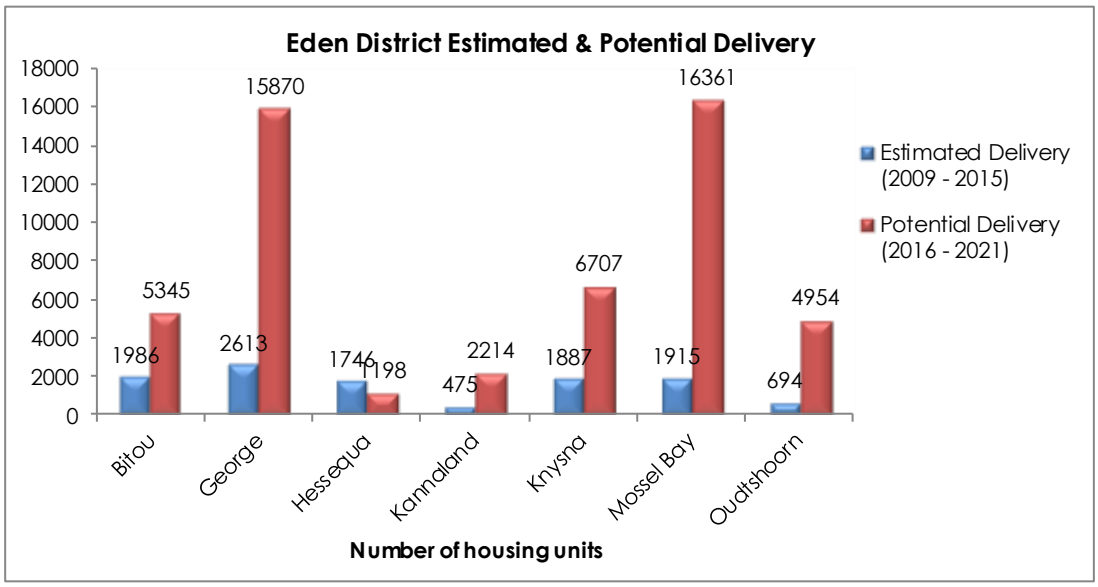


Figure 50: Estimated & Potential Housing Unit Delivery

The current housing backlog and IDP housing projects are shown in Table 35.

Table 33: Housing Backlog and IDP projects (IDP Review, 2014/15)

Municipality	Housing Backlog	Housing projects	Budgeted/ Estimated Cost
Bitou	No clear indication	4 054 units	R 101 300 000 (2014 – 2017)
George	19 000 units	No clear indication	R2.5 billion (over a 41 year period)
Hessequa	5 761 (7788) people	No clear indication	R111.7 million (2014 – 2020)
Kannaland	2 503 (Subsidy housing) 222 (GAP housing)	No clear indication	DoRA & private funding
Knysna	12 589 applications	No clear indication	R46 000 000 (2014/15)
			R64 000 000 (2015/16)
Mossel Bay	13 243 applications (2014 - 2018)	8 existing projects	R145 100 000 (2014/15)
		12 planned projects	R249 250 000 (2014 - 2018)
Oudtshoorn	No clear indication	300 units	R19 001 000
		300 units	R19 001 000
		Social Housing	R48 000 000

The municipal IDP Reviews (2014/15) highlights the topography of the Knysna Municipality makes it difficult to provide bulk services and infrastructure for housing development and to ensure that the municipality addresses the housing backlogs that grow annually.

4.6.2.8 Housing demand and delivery

This section focuses on how the current and future housing status will affect the provision of the waste collection service. The EDM service levels data used in this section, basic services (93%) and free basic services (99%), was obtained from the Department of Local Government and provides the status of service levels as at June 2015. The data, however, does not provide specifics with respect to service provision to informal dwellings, particularly informal settlements.

4.6.2.8.1 Bitou Municipality

The service levels for Bitou are at 100% for both basic and free basic services as at June 2015. The municipality has 7 066 people registered on the housing demand database (as at July 2015). The estimated housing delivery between 2009 and 2015 was 1 986 and the potential housing delivery from 2016 to 2021 is 5 345. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.6.2.8.2 George Municipality

The service levels for George are at 100% for both basic and free basic services as at June 2015. The municipality has the highest number of people (17 265)_registered on the housing demand database within the district (as at July 2015). The municipality also had the highest estimated delivery between 2009 and 2015 at 2 613 houses and the potential housing delivery from 2016 to 2021 is 15 870. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.6.2.8.3 Hessequa Municipality

The service levels for Hessequa are at 62% for basic services and at 100% for free basic services as at June 2015. The municipality has 3 280 people registered on the housing demand database (as at July 2015) and an estimated housing delivery of 1 746 between 2009 and 2015. Hessequa has a potential to deliver 1 198 houses from 2016 to 2021. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a basic service to the 38% of households without a service currently,
- improving the waste collection service, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

4.6.2.8.4 Kannaland Municipality

The service levels for Kannaland are at 100% for both basic and free basic services as at June 2015. The municipality has 2 963 people registered on the housing demand database (as at July 2015). The municipality had an estimated housing delivery of 475 between 2009 and 2015, and the potential housing delivery from 2016 to 2021 is 2 214. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.6.2.8.5 Knysna Municipality

The service levels for Knysna are at 73% for basic services and at 100% for free basic services as at June 2015. The municipality has 9 748 people registered on the housing demand database (as at July 2015) and an estimated housing delivery of 1 887 between 2009 and 2015. Hessequa has a potential to deliver 6 707 houses from 2016 to 2021. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a basic service to the 27% of households without a service currently,
- improving the waste collection service, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

4.6.2.8.6 Mossel Bay Municipality

The service levels for Mossel Bay are at 100% for both basic and free basic services as at June 2015. The municipality has 10 088 people registered on the housing demand database (as at July 2015). The municipality had an estimated housing delivery of 1 915 between 2009 and 2015 and has the highest potential housing delivery at 16 361 for the year 2016 to 2021. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.6.2.8.7 Oudtshoorn Municipality

The service levels for Oudtshoorn are at 100% for basic services and at 90% for free basic services as at June 2015. The municipality has 14 298 people registered on the housing demand database (as at July 2015) and an estimated housing delivery of 694 between 2009 and 2015. Oudtshoorn has a potential to deliver 4 954 houses from 2016 to 2021. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a free basic service to the 10% of households without a service currently,
- improving the waste collection service, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

All the local municipalities within the EDM either provide a communal waste collection service through skips and others provide a bag containment service in informal settlements. In formal dwellings, a bag containment is usually provide in low income housing and a wheelie bin containment service is usually provided in middle or high income housing. Municipalities might improve services by moving from communal waste collection to the provision of bags or from a bag containment service to the provision of wheelie bins.

Municipalities are faced with the challenge of increasing informal settlements and as a result are struggling to meet the demand for delivery of low income housing. The National Department of Human Settlements has the Upgrading Informal Settlements Programme (UISP), which is an initiative to aimed at upgrading informal settlements through various grants. The UISP aims to provide and improve basic services to informal settlements as well as provide secure tenure to ensure that informal settlements are in well-located and legal land. The provision of basic services includes the upgrade of a communal waste collection service to a household refuse collection or the provision of a bag containment service.

4.6.3 Waste generation areas

4.6.3.1 General waste

Waste generation rates varies between municipalities and the following rates, as reflected in the local municipal IWMPs were used.

- Kannaland Local Municipality – 0.92kg/c/day
- Hessequa Local Municipality – 0.89kg/c/day
- Mossel Bay Local Municipality – 1.01kg/c/day
- George Local Municipality – 0.88kg/c/day
- Oudtshoorn Local Municipality – 0.83kg/c/day
- Bitou Local Municipality – 0.89kg/c/day
- Knysna Local Municipality – 0.86kg/c/day

Based on the above rates it is estimated that waste generation figures in EDM, using the 2015 population figures as the baseline, will increase by 5.2% by 2020, 13.8% by 2030 and 20.5% by 2040. The projected general waste generation figures include general waste from households, commercial, industrial facilities and seasonal waste from holiday makers.

Figure 51 depicts waste generation quantities for EDM for the years 2015 to 2040.

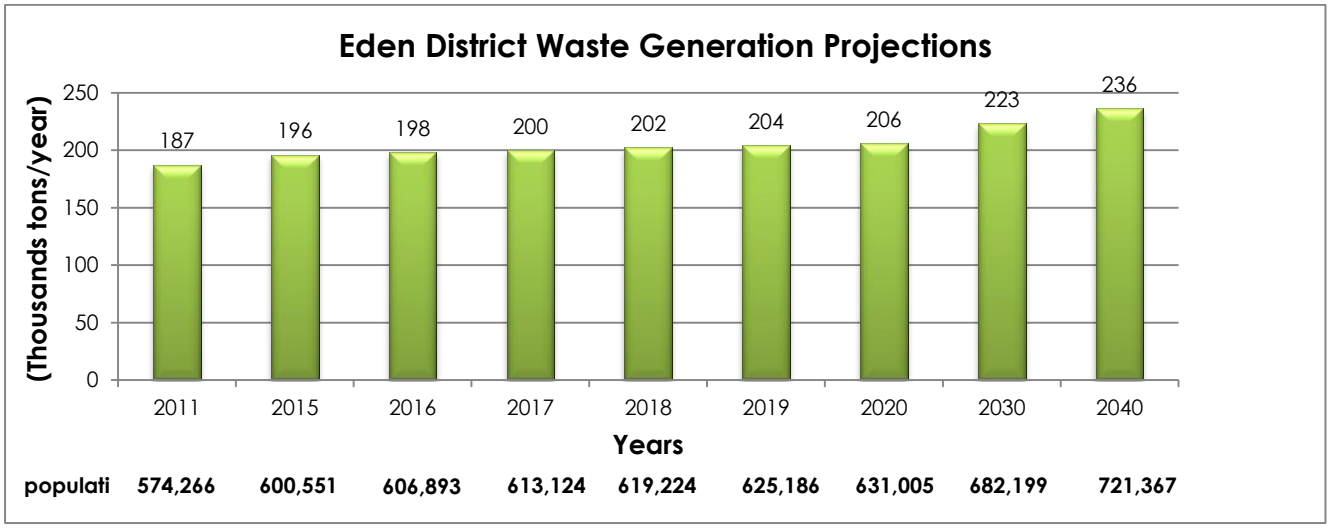


Figure 51: Waste generation quantities 2015 – 2040

4.6.3.2 Waste composition

EDM drafted a Waste Characterisation Business Plan where they plan to conduct four studies per municipality over the 2015/16 financial years. The Department supported the Business Plan and provided training to the WMOs in the various municipalities. The first study was recently conducted in Bitou Municipality. The district will be responsible for the collation, analysis and results of this study.

The dominant waste streams during the 2007 study were paper and cardboard (18%), plastics (13%), glass(11%) and organics(18%).

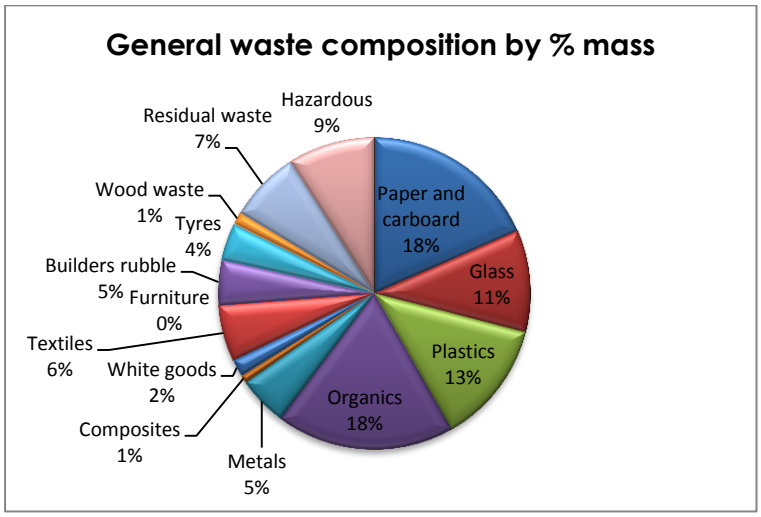


Figure 52: Waste composition by % mass

4.6.3.3 Health care risk waste

The Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007) defines Health Care Risk Waste (HCRW) as that portion of health care waste that is hazardous and includes infectious waste, pathological waste, sharp waste, pharmaceutical waste, genotoxic waste, chemical waste, waste with heavy metals, radioactive waste, and any other health care waste which is defined as hazardous in terms of the Waste Management Series: Document 1: Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, as published by the Department of Water Affairs and Forestry.

HCRW is either incinerated as a means of disposal or treated through Electro Thermal Destruction. Incineration of HCRW is one of the most effective means to eliminate the risks posed by health care risk waste and also reduces the overall volume of the waste. HCRW is mainly removed to be treated and disposed by service providers who have to be registered on the Western Cape Integrated Pollutant and Waste Information System (IPWIS) as required in terms of the National Environmental Management: Waste Act: National Waste Information Regulations, January 2013. The HCRW Generators are also required to register and report to the provincial IPWIS, which then exports the data onto the national waste information system (SAWIS).

According to the IPWIS (October 2015), 133 governmental, non-governmental and private healthcare facilities within EDM have registered and 88 are reporting on the provincial system to date.

Table 34 depicts the number and types of healthcare facilities available across EDM.

Table 34: Healthcare facilities

Community health centres	Community day centres	Number of PHC clinics - fixed	Number of PHC clinics - non-fixed (satellites)	Number of PHC clinics - non-fixed (mobiles)	Number of district hospitals	Number of regional hospitals	Total
0	6	36	12	21	6	1	**82**

Source: WCG Provincial Treasury - Socio-economic Profile 2014 Working paper

The amount of HCRW reported on the IPWIS for the period January 2014 to August 2015 amounted to 26,455 tonnes. Figure 53 provides the percentage distribution of HCRW across EDM.

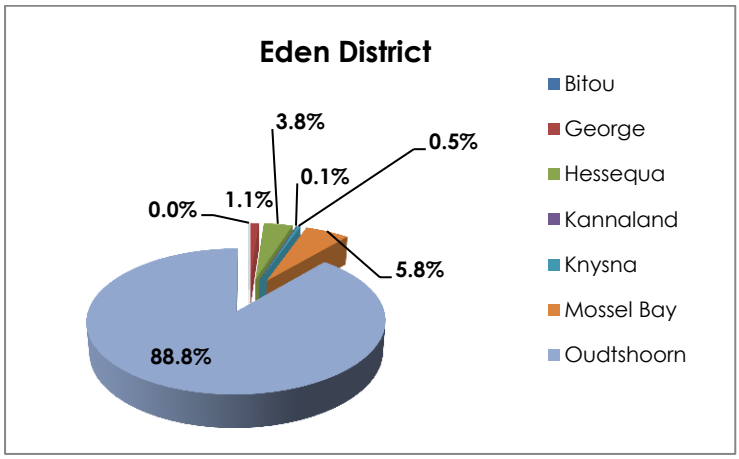


Figure 53: Healthcare risk waste percentage distribution

4.6.3.4 Hazardous waste

There is one hazardous waste facility in the EDM namely, PetroSA. The faciity is situated along the N2 outside Mossel Bay. Hazardous waste disposed of at the facility includes diesel sludge, slop oil, HFO, oil &water mixture, oil sludge, distillate, gunk oil, water with chemicals, water and alcohol, diesel, petrol and alkylate caustic sludge etc. In 2014 at least 4 313m^3 of hazardous waste was disposed of and this increased to 5 230m^3 in 2015.

4.6.3.5 Problem waste streams

4.6.3.5.1 Agricultural waste

The main commodities cultivated in the district are cereals and vegetable oils 45.

There is a lack of information on the liquid and solid waste originating from these production processes.

4.6.3.5.2 Sewage sludge

Table 35 depicts sewage sludge management in EDM.

Table 35: Wastewater Treatment Works and sewage sludge disposal

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Kannaland	Ladismith	Sludge quantities unknown	Sludge is buried in trenches on site.
	Zoar	Sludge quantities unknown	Sludge buried in trenches near WDF.
	Calitzdorp	Not applicable (ponds)	Not applicable (ponds)
	Van Wyksdorp	Not applicable (package plant)	Not applicable (package plant)
Hessequa	Gouritsmond	Sludge quantities unknown	Sludge is dried out and used for composting.
	Albertinia	Sludge quantities unknown	Sludge is dried out and used for composting
	Melkhoutfontein	Sludge quantities unknown	Sludge is dried out and used for composting
	Stilbaai	Sludge quantities unknown	Sludge is dried out and used for composting
	Jongensfontein	Sludge quantities unknown	Sludge is dried out and used for composting
	Riversdale	Sludge quantities unknown	Sludge is dried out and used for composting
	Garcia	Sludge quantities unknown	Sludge is dried out and used for composting
	Heidelberg	Sludge quantities unknown	Sludge is dried out and used for composting
	Slangrivier	Sludge quantities unknown	Sludge is dried out and used for composting
	Witsand	Sludge quantities unknown	Sludge is dried out and used for composting
	Vermaaklikheid	Sludge quantities unknown	Sludge is dried out and used for composting

[45] Western Cape Government: Water Infrastructure & opportunities for agriculture & agri-processing in the Western Cape (2015)

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Mossel Bay	Brandwag	No information received	Sludge is dried on-site and transported to Mossel Bay Regional WWTW. Sludge is then collected by two private operators for land application/composting.
	Friemersheim Western	No information received	Sludge is dried on site and transported to Mossel Bay Regional WWTW. Sludge is then collected by two private operators for land application/composting.
	Friemersheim B (small)	No information received	Sludge is dried on-site and transported to Mossel Bay Regional WWTW. Sludge is then collected by two private operators for land application/composting.
	Grootbrak	No information received	Sludge is dried on-site and transported to Mossel Bay Regional WWTW. Sludge is then collected by two private operators for land application/composting.
	Herbertsdale	No information received	Sludge is dried on-site and transported to Mossel Bay Regional WWTW. Sludge is then collected by two private operators for land application/composting.
	Mossel Bay - Hartenbos	No information received	Sludge is collected by two private operators for land application/composting.
	Pinnacle Point	No information received	Sludge is dried on-site and transported to Mossel Bay Regional WWTW. Sludge is then collected by two private operators for land application/composting.
	Ruiterbos	No information received	Sludge is dried on-site and transported to Mossel Bay Regional WWTW. Sludge is then collected by two private operators for land application/composting.

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
George	Outeniqua	No information received	Land application. The remaining sludge is disposed at the open space at Gwaing WWTW.
	Kleinkranz	No information received	Land application. The remaining sludge is disposed at the open space at Gwaing WWTW.
	Uniondale	No information received	No information received
	Harlem	No information received	The sludge is pumped and treated at Uniondale WWTW.
	Herold's Bay	No information received	No information received
	Gwaing	No information received	No information received
Oudtshoorn	De Rust	No information received	Sludge is stockpiled on site.
	Dysselsdorp	No information received	Sludge is stockpiled on site.
	Oudtshoorn	No information received	Sludge is stockpiled on site.
Bitou	Gansevalei	1.35 tonnes per day	Sludge is kept in sludge lagoons and then disposed of at a waste disposal site.
	Kurland		Sludge is disposed of at a waste disposal site.
Knysna	Knysna	4504m^3 per month	Sludge is taken to Sassenheim Estate three times a year. Most of the time sludge is stored on site.
	Rheenendal	360m^3 per month	Sludge is taken to Knysna WWTW, where it is either taken to Sassenheim Estate or stored on site.
	Karatara	Sludge quantities unknown	Sludge is taken to Knysna WWTW, where it is either taken to Sassenheim Estate or stored on site.
	Sedgefield	32 tonnes per month	Sludge is taken to Knysna WWTW, where it is either taken to Sassenheim Estate or stored on site.
	Brenton-on-sea	12 tonnes per month	Sludge is taken to Knysna WWTW, where it is either taken to Sassenheim Estate or stored on site.
	Belvedere	26 tonnes per month	Sludge is taken to Knysna WWTW, where it is either taken to Sassenheim Estate or stored on site.
	Knysna SBR	No information received	No information received

4.6.3.5.3 Abattoir waste

The following information was obtained regarding management of abattoir waste in EDM.

Table 36: Abattoir waste

Municipality	Number of abattoirs	Disposal methods	Disposal quantities
Kannaland	1	No agreement exists between the Municipality and owners. Waste is buried in trenches at the WDF	Unknown
Hessequa	Unknown	Unknown	Unknown
Mossel Bay	Unknown	Unknown	Unknown
George	2	Abattoirs are no longer allowed to dispose of in trenches at municipal WDFs.	Van Rensburg Abattoir - 32 tonnes per month Roelcor Abattoir - 72 tonnes per month
Oudtshoorn	Unknown	Unknown	Unknown
Bitou	Unknown	Unknown	Unknown
Knysna	2	Knysna and Karatara. Waste is buried on the owner's private property.	Unknown

4.4.9.1.1 Tyres

Handling of tyre waste and quantities are unknown due to limited reporting from industries.

4.6.4 Waste avoidance, reduction and recycling

4.6.4.1 Waste avoidance and recycling[46]

The district has played a co-ordinatring role with regards to waste minimisation. They have planned numerous waste minimisation roadshows over the years. The following projects were initiated, supported and implemented in collaboration with the municipalities:

- E-waste education, awareness and safe disposal programme;
- Used oil recycling education, awareness and safe disposal programme;
- Waste minimisation road show;
- Wise up on waste education on waste management and minimisation programme at pre-schools and schools;
- Development of a regional strategic waste minimisation plan and waste minimisation awareness and education campaign;
- Eden Integrated Waste Information System registration and reporting from all waste generators and recyclers; and
- Waste characterisation surveys at all the local municipalities during the four seasons and during the summer holiday time.

4.6.4.1.1 Bitou Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- The municipality embarked on a campaign against illegal dumping.
- Waste management information is provided to residents in the form of a municipal newsletter.
- Signage about waste minimisation is placed within the municipality.

Waste minimisation

The following waste minimisation initiatives are implemented in this municipality:

- The municipality supports the Qolweni swop shop.
- Two buy-back centres are supported by the Local Economic Development section of the municipality.
- The Municipality implements a split bag system and has appointed a service provider for collection.
- Igloos are strategically placed for recyclables to be dropped off by the community.
- Materials recovery is supported by the municipality.

[46] Greenest Municipality Competition: Waste Management Report 2015/2016

Job creation

- EPWP workers have been employed to assist with collection services. The Municipality implements the 'Food for Waste Recycling' programme, which created 100 job opportunities as well as a participant in the Youth Jobs in Waste Programme.

4.6.4.1.2 George Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- Signage was placed at the main entrances into George.
- Youth Jobs in Waste workers raise awareness about various waste management aspects in the communities.
- The municipality uses public address systems to create waste awareness once a week in the evenings in residential areas.
- Radio and newspapers are used at least once a month to raise awareness on waste management.
- A door-to-door awareness drive was done on waste management in which a survey was completed and pamphlets on recycling and illegal dumping were distributed.
- Training on how to recycle is provided in informal areas.
- Newspaper articles are written on "green projects".
- Presentations on the Greenest Municipality Competition elements are done at high schools, primary schools and crèches.
- Clean-up campaigns are conducted with community environmental NGO's and other government departments.
- Exhibitions are done at high schools to display environmental information.
- Environmental calendar days are celebrated. A clean-up was done on 5 June 2015 for World Environment Day.
- An information desk is available in area offices.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- The Municipality supports the Kretzenhoop Primary School swop shop in Blanco.
- Recycling bins are placed at 17 primary schools within the Municipality.
- The Municipality supports the buy-back centre operated by Interwaste.
- Used oil is recovered at the Gwaing Transfer Station.

Job creation

- The Municipality implemented the Youth Jobs in Waste Programme. Approximately 140 people were also employed for area cleaning in problem areas utilising community contractors. The Municipality also employed 31 informal waste pickers at the transfer station.

4.6.4.1.3 Hessequa Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- Waste awareness articles are placed in the Mayor's monthly newsletter to help create awareness and inform the community of planned waste management road shows and campaigns.
- Waste awareness messages are regularly featured in the local press "Suid Kaap Forum" and posters are placed at municipal cashier's offices and libraries.
- The Municipality participates in the Eden District Municipality's roadshow as part of the Waste Minimisation Public Awareness and Minimisation Campaign.
- Youth Jobs in Waste workers implements awareness campaigns.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- The Municipality operates a split-bag system to collect recyclables from households. This service is also extended to low income residential areas.
- The Municipality supports material recovery in collaboration with Henque Waste, who is contracted to operate the MRF and also manages a buy back centre.
- The Municipality acquired a chipping machine and has started chipping garden waste.
- Home composting is promoted by the muncipality and residents are provided with composting bins.
- Used oil is also recovered in the Municipality in co-operation with Eden District Municipality.

Job creation

- Yearly temporary workers are employed by the Municipality.
- A contractor was appointed to clean residential areas.

4.6.4.1.4 Kannaland Municipality

Waste awareness

- No waste awareness initiatives are known to DEADP.

Waste minimisation

- No municipal minimisation initiatives are known to DEADP.

Job creation

- No waste –related job creation initiatives are known to DEADP.

4.6.4.1.5 Knysna Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- The municipality hosted an Open Day Road Show and exhibition in September 2014. The municipality hosts programmes such as the Township Green which involves a group of individuals that run waste awareness at schools on the three R's (reduce, re-use, and recycle). They have done four shows at four schools.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- There are 7 swop shops covering the following areas: Rheenendal; Fresh Start swop shop, in Smutsville, Sinethembe swop shop in the Northern Area and Hornlee swop shop in Hornlee. All are supported by the municipality through the provision of containers and the transport of recyclables.
- A split bag pilot is implemented covering the following residential areas: The Heads, Leisure Isle, Hunters Home, Old Place, Costa Sarda, Upper Town, Lower Town, Greenhaven, Paradise, Knysna Heights, Welbedaght, Bellvidere, Brenton on Sea, Brenton on Lake, Hornlee as well as all formal residential areas in Sedgefield.
- An e-waste drop-off service is provided at the Knysna Transfer Station, recycling bins at Knysna Recycling Centre and a container for used oil at Knysna Transfer Station. This supplements waste recovery in the Municipality.
- The chipping and composting of green waste takes place at 3 garden waste sites in the Municipality.

Job creation

- The Municipality has funded projects like the Ward clean-up campaigns and has EPWP funding and use some resources to fund a community clean-up project.

4.6.4.1.6 Mosselbay Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- The municipality celebrates environmental calendar days. World Environment Day was celebrated with an Illegal Dumping Street March on 5 March 2015 and Annual Beach Clean-Up on 26 June 2015.
- The municipality implements a Waste Minimisation Road Show.
- The municipality supports the Mossel Bay Arts and Craft Workshop and Exhibition Centre which gives training in the utilisation of waste items to produce arts and crafts and exhibits these as a tourism enhancement project.
- Signage about cleanliness can be seen in the town centre and no dumping signs in dumping hotspots.

Waste minimisation

- The municipality supports two swop shops which are situated in Great Brak River and KwaNonqaba. The swop shops are registered with the Premier's 110% Green Initiative. The municipality obtained sponsorships to ensure the sustainability of the swop shops. Waste is removed regularly by the recycling facility.
- Waste separation at source is implemented by means of black bags for refuse and blue bags for recyclable materials.
- The municipality has drop-off sites in Great Brak River, Glentana, Boggomsbaai and Little Brak River. Igloos have also been strategically placed throughout the Municipality. The municipality is also in the process of placing igloos at all petrol stations and the malls.
- The municipality supports material recovery and has appointed a contractor for the collection of recyclable material from the residential areas with a roll-out percentage of 60%. The Municipality also has an office recycling programme which has been running since 2011. A waste tyre facility in Mossdustria is also the only depot in the Southern Cape which has been initiated through REDISA. Furthermore, Herbertsdale recycling art, an arts and crafts workshop is also supported by the LED Department of the Municipality. E-waste is collected at the Sonskynvallei Transfer Station.
- The municipality has appointed a contractor and 20 individuals to sort material for chipping.
- E-waste and waste oil is collected at refuse transfer stations within the municipality.

Job creation

- The Municipality employs approximately 300 unemployed individuals annually as part of the street cleaning entrepreneurs' project. The aim of this project is job creation and poverty alleviation giving unemployed residents the opportunity to earn an income and at the same time to start up a small business as an entrepreneur. During 2015 a budget of R9,8 million was spent on the cleaning project.
- Additional teams have been appointed to address illegal dumping, clearing and spraying of herbicides in the residential areas. Five women from this project have been selected to be part of the national Gender Links project empowering them with business management skills.

4.6.4.1.7 Oudtshoorn Municipality

Waste awareness

- No awareness projects are currently implemented.

Waste minimisation

- No waste minimisation projects are currently implemented.

Job creation

- Youth Jobs in Waste workers were appointed by the municipality.

4.6.4.2 Waste information

4.6.4.2.1 Bitou Municipality

Bitou Municipality has not reported to the IPWIS or used the waste calculator in the 2014/2015 financial year.

4.6.4.2.2 George Municipality

Waste information was regularly reported to the Department.

4.6.4.2.3 Hessequa Municipality

The municipality reports to the IPWIS.

4.6.4.2.4 Kannaland

The municipality reports on IPWIS and uses the provincial waste calculator. The Municipality's compliance rating is at 50%.

4.6.4.2.5 Knysna

The municipality reports to the IPWIS.

4.6.4.2.6 Mossel Bay Municipality

The municipality does not report to the IPWIS.

4.6.4.2.7 Oudtshoorn

No information is reported to the DEADP via IPWIS or the Waste Calculator.

4.6.5 Treatment and disposal

Figure 54 depicts compliance scores at WMFs that were audited in the 2015/16 financial year. Key challenges experienced at the WMFs are lack of cover material, windblown litter, fencing, storm water management, limited machinery and component security and operational staff. Burning of waste takes place at most facilities. Facilities which yielded red ratings (0 -64%) and amber ratings (65 – 84%) will receive priority for the 2016/17 financial year.

Compliance scores ratings:

Total	Status Indicator		Action
85 – 100 %	Green	X	Small changes needed
65 – 84 %	Amber		Improvements required
0 – 64 %	Red		Major improvements required

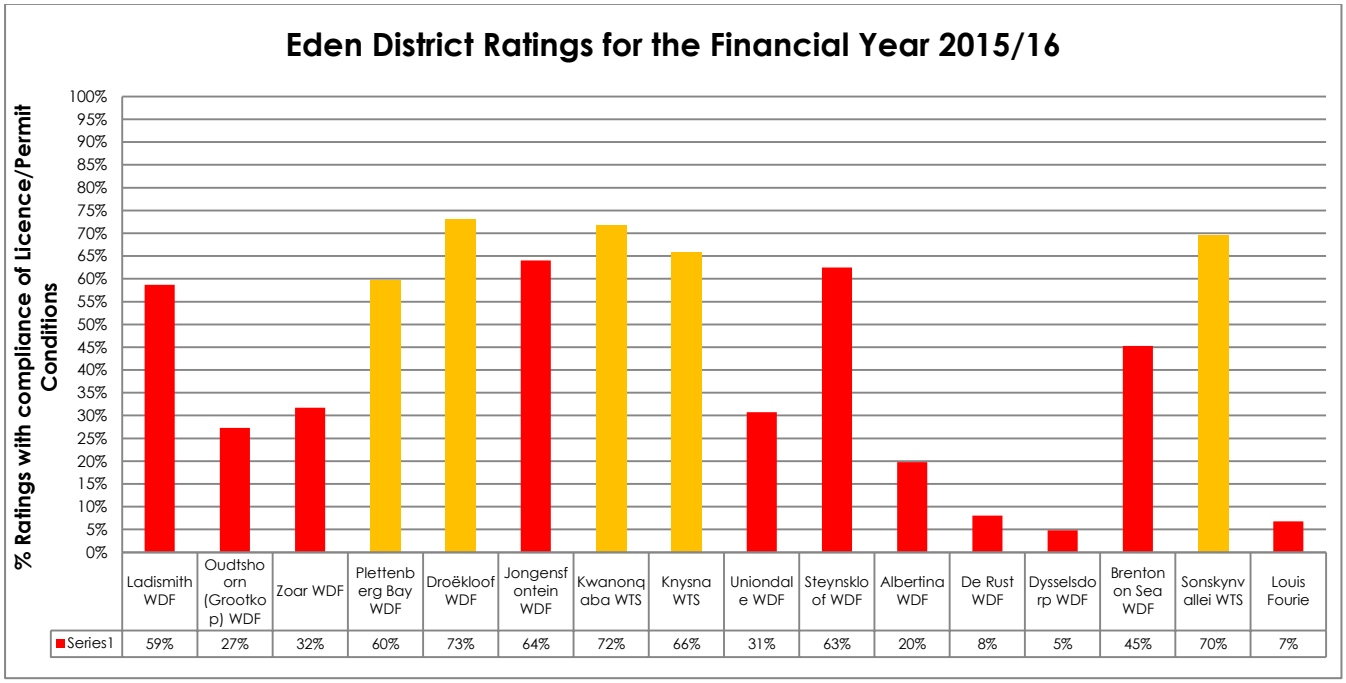


Figure 54: Compliance audit outcomes of Waste Management Facilities

The status quo of waste management facilities in EDM is provided in Table 40.

It should be noted that the facilities in Table 40 with decommission licence type statuses isssued in 2014/15 fiscal year are issued with licence conditions to commence with decommissioning within a 5 year period. This condition was implemented to allow the Municipalities to plan and prepare alternatives for the closure of the waste disposal facilities.

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Table 37: Conditions of Waste Management Facilities

Municipalities	Waste Management Facility	Classification	Licence Type	Available Air space	Types of Waste
Bitou	Plettenberg Bay WDF	G:S:B+	Decommission	Unknown	General household waste, garden waste & building rubble
	Natures Valley RTS			Unknown	unknown
George	Uniondale WDF	n/a	Decommission (2014/15)	Capacity has been reached (2014)	General waste, commercial waste, garden waste & building rubble
	Gwaing WDF	n/a	Decommission (2014/15)	Sufficient airspace	Garden waste, building rubble & mixed waste
	George RTS		Operation	n/	General household waste & commercial waste
	George WDF	G:C:B-	Decommission	n/a	Garden refuse and Builders rubble landfill site
Hessequa	Droekloof WDF	G:S:B-	Operation	More than 5 years	General waste, building rubble & garden waste
	Albertinia WDF	G:C:B-	Operation	Unknown	Garden waste &building rubble
	Gouritsmond WDF	G:C:B-	Decommission (2014/15)	Unknown	Garden waste & building rubble
	Gouritsmond RTS			n/a	
	Melkhoutfontein WDF	G:C:B-	Operation	Unknown	Garden waste & building rubble
	Slangrivier WDF	G:S:B-		Approx. more than 10 years (2014)	Garden waste & building rubble
	Steynskloof WDF	G:S:B-	Operation	Unknown	Garden waste & building rubble
	Witsand WDF		Operation	Unknown	Garden waste & building rubble
	Heidelberg WDF	G:S:B-	Operation	Unknown	
	Langsrivier WDF	G:S:B-	Operation	Unknown	

Municipalities	Waste Management Facility	Classification	Licence Type	Available Air space	Types of Waste
Oudtshoon	Grootkop WDF	G:M:B-	Operation	Approx. 42 years (2013 data)	General household waste, commercial waste, garden & building rubble
	Dysselsdorp WDF	G:C:B-	Closure	Unknown	General household waste, commercial waste, garden & building rubble
	De Rust WDF	G:C:B-	Operation	Unknown	General household waste, commercial waste, garden & building rubble
	Oudtshoon WDF	G:M:B-	Operation	Unknown	
	Ladismith WDF	G:S:B-	Operation	Unknown	
Kannaland	Zoar WDF	G:S:B-	Operation	Unknown	General household waste, garden waste, building rubble
	Calitzorp WDF	G:C:B-	Decommission (2014/15)	Unknown	Garden waste, building rubble
	Van Wyksdorp WDF	G:C:B-	Operation	Unknown	Garden waste, building rubble
	Old place garden waste site WDF		Decommission	1year (2014 report)	Garden waste, building rubble
Knysna	Brenton WDF		Decommission	Unknown	Garden waste
	Knynsa RTS		Operation	n/a	General waste
	Knynsa WDF	G:C:B+	Operation	Unknown	Garden refuse site
	Knynsa WDF	G:C:B+	Decommission	n/a	
	Great Brak WDF	G:C:B-	Decommission (2014/15)	n/a	Garden waste, building rubble
Mossel Bay	Louis Fourie WDF		Decommission	Unknown	Garden waste, building rubble
	Kwanonqaba RTS	G:C:B-	Operation	n/a	
	Sonskynvallei RTS	G:C:B-	Operation	n/a	General waste
	Mossel Bay WDF	n/a	Decommission (2014/15)	n/a	
	Herbertsdale WDF	n/a	Decommission (2014/15)	n/a	

4.6.5.1 Regionalisation of waste management

The EDM has established an integrated waste management forum in 2006. The forum meets on a two monthly basis where WMOs from all seven local municipalities meet to discuss projects on a regional scale. The need for a regional waste management facility, to replace the existing PetroSA facility, started in 2006. A Final Scoping Report and Plan of Study for an Environmental Impact Assessment was accepted in September 2011. An Environmental Authorisation was received in May 2013 and a waste licence was issued in February 2014. The facility will be managed through a Public Private Partnership and will service the municipalities of Mossel Bay, Knysna, George and Bitou Municipality. Construction will start in early 2016.

Some facts about the facility:

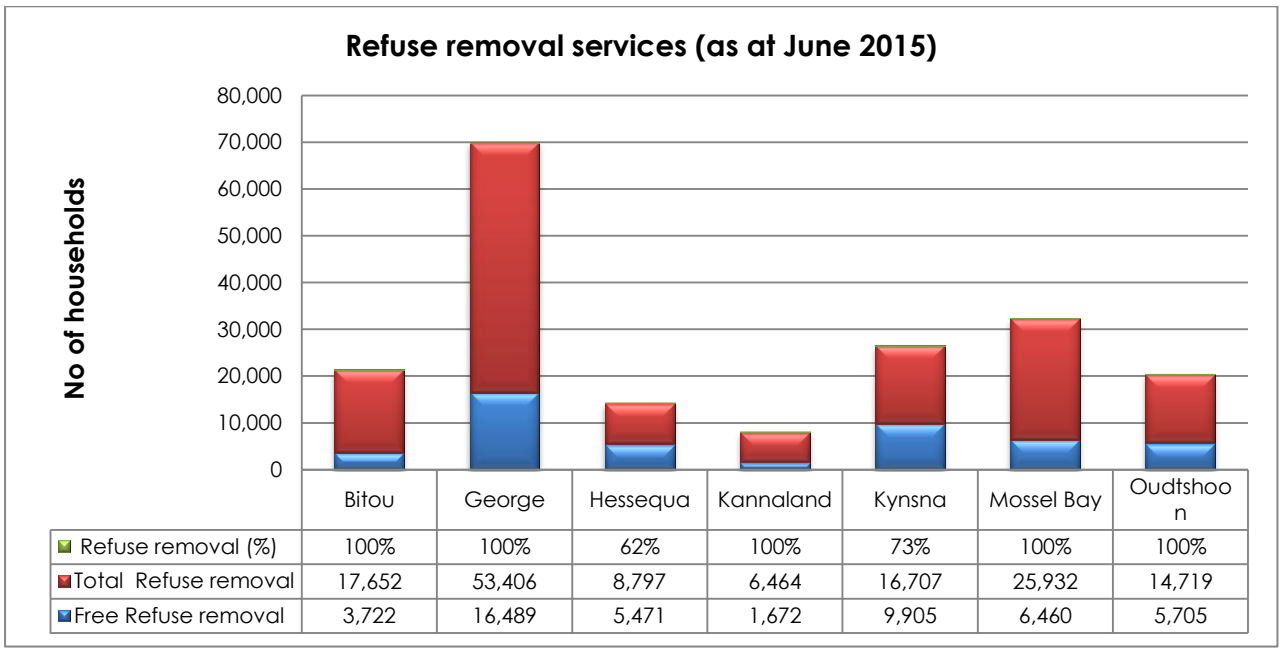
- Household waste
- Hazardous waste (Class 3 and 4 Rating)
- ± 50 year landfill airspace
- ± 205 hectares with a landfill height of 12 m
- Construction waste recycling facility (Mossel Bay facility has a roaming crusher for use by other municipalities)
- Green waste chipping/composting facility (Mossel Bay Municipality)
- Waste Recovery Facility
- Accessible from the N2 on the southern side and from the railway line on the northern side.

4.6.6 Current and upcoming alternative waste treatment options

There are currently no upcoming alternative waste treatment options planned in the district.

4.6.7 Waste collection services

Figure 55 depicts the level of refuse removal services as at June 2015. Hessequa Local Municipality provides the lowest level of refuse removal services (62%) followed by Knysna (73%).



	Bitou	George	Hessequa	Kannaland	Kynsna	Mossel Bay	Oudtshoo n
Refuse removal (%)	100%	100%	62%	100%	73%	100%	100%
Total Refuse removal	17,652	53,406	8,797	6,464	16,707	25,932	14,719
Free Refuse removal	3,722	16,489	5,471	1,672	9,905	6,460	5,705

Figure 55: Basic services 2001 vs 2011 (Provincial Treasury, 2015)

4.6.7.1 Illegal dumping

The EDM has by-laws in place that prohibit littering and illegal dumping and the municipality provides mechanisms to deal with offenders. However, Illegal dumping and littering is one of the most common problems in the EDM. The following has been reported in the various municipalities:

- Hessequa Municipality – dumping of garden greens is prominent in the municipal area. The cost for dealing with illegal dumping is approximately R3 023 088 per annum;
- Bitou Municipality – estimated costs per annum R 411 127;
- George Municipality – cost of cleansing and illegal dumping (including salaries) is approximately R 9 185 800;
- Knysna Municipality – estimated costs per annum R1 803 530;
- Mossel Bay Municipality – appoints a contractor with estimated costs of R 484 000 per annum
- Oudshoorn Municipality – the total cost for dealing with illegal dumping is estimated to be R 950 000 per annum
- Kannaland Municipality – unknown.

4.6.8 Cost of existing waste management system

4.6.8.1 Tariffs

Goal 6 of the NWMS request all municipalities that provide waste services to conduct full-cost accounting for waste service and implement cost reflective tariffs.

In most municipalities the tariff structure for use of the waste disposal services is unclear. However, these are escalated annually.

4.6.8.2 Budget

The combined budget of EDM are shown in Table 38.

Table 38: District Budget (EDM IWMP, 2014)

Description	2012/13 (R)	2013/14(R)	2014/15 (R)
Employee related costs	1 069 238	1 127 905	1 188 812
Depreciation	337 287	356 175	275 408
Repairs and maintenance	2 000	2 112	2 226
Article 78 Investigation Phase 2 & 3	n/a	686 800	n/a
Specialist Studies	n/a	357 000	n/a
Integrated Waste Management Plan	n/a	500 000	n/a
Property Valuation	n/a	2 500	n/a
Land Use Zoning	n/a	50 000	n/
Water Use Licence Application	n/a	10 000	n/a
General Expenses	56 033	59 171	62 366

In addition to the above, DEADP obtained financial OPEX and CAPEX (audited) for all local municipalities from Provincial Treasury. It should be noted that these are financial summaries of waste management services.

Table 39: CAPEX for EDM (2011/12 – 2014/15)

CAPEX	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Eden DM	Unknown	9	Unknown	Unknown
Bitou	190	Unknown	3 708	8 508
George	Unknown	347	3 914	10 959
Hessequa	1 254	Unknown	Unknown	1 223
Kannaland	Unknown	Unknown	399	Unknown
Knysna	963	1 689	Unknown	Unknown
Mossel Bay	2 116	2 189	200	3 523
Oudtshoorn	Unknown	175	Unknown	397
Total	4 523	4 409	8 221	24 610

Source: Provincial Treasury

Table 40: OPEX Revenue for EDM (2011/12 – 2014/15)

OPEX- Revenue	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Eden DM	Unknown	312	120	1 122
Bitou	16 184	18 166	25 105	39 248
George	58 344	58 704	67 564	66 198
Hessequa	11 110	12 222	8 834	14 381
Kannaland	4 184	3 279	4 543	8 184
Knysna	20 513	21 079	22 801	26 158
Mossel Bay	44 978	47 834	40 689	44 026
Oudtshoorn	8 752	9 803	14 477	15 754
Total	164 065	171 397	184 133	215 070

Source: Provincial Treasury

Table 41: OPEX Expenditure for EDM (2011/12 – 2014/15)

OPEX-Expenditure	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Eden DM	1 860	2 148	1 688	3 347
Bitou	13 428	18 177	19 633	43 979
George	42 565	47 925	47 708	51 786
Hessequa	9 365	11 023	8 509	11 635
Kannaland	Unknown	Unknown	Unknown	2 841
Knysna	21 896	20 716	23 340	25 758
Mossel Bay	35 345	43 434	36 214	41 090
Oudtshoorn	16 577	17 959	19 146	15 299
Total	141 036	161 382	156 238	195 735

Source: Provincial Treasury

Figure 56 shows the OPEX Revenue vs OPEX Expenditure for waste management services in the various local municipalities. Most of the municipalities are in a positive position with the exception of Bitou municipality.

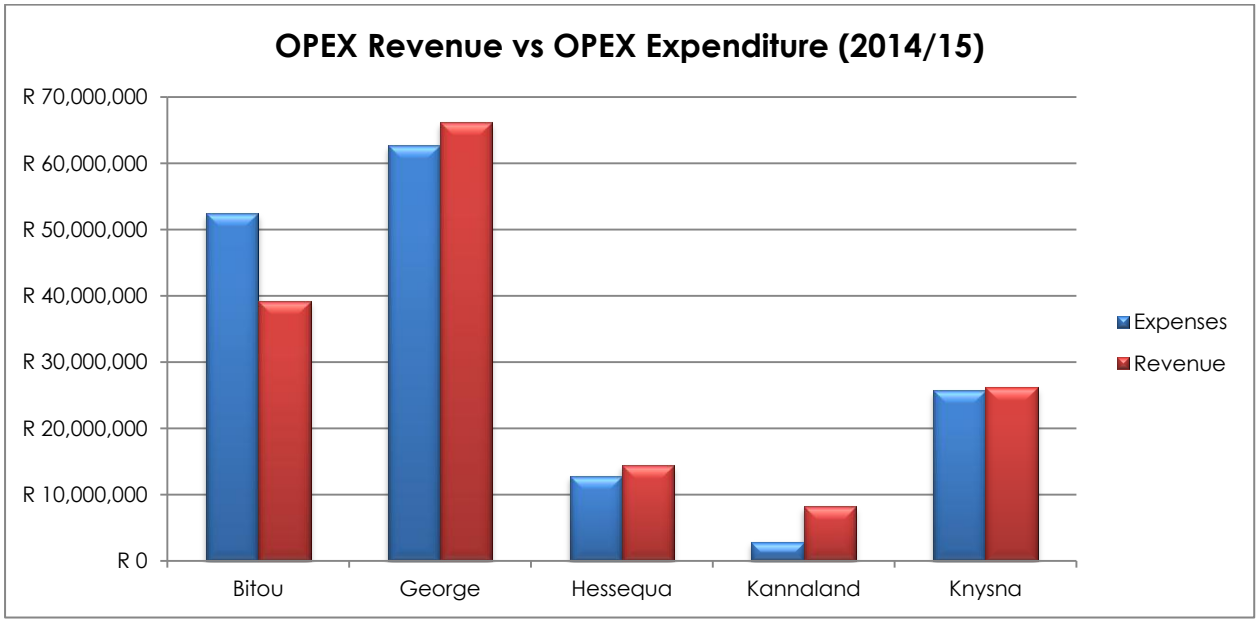


Figure 56: OPEX Revenue vs OPEX Expenditure: 2014/15 (Source: Provincial Treasury, 2014/15)

4.6.9 Governance

The EDM has a well structured organisational structure who handles and implements integrated waste management services in the district. The district has a designated WMO who manages all district matters as well as the district Waste Manager's Forum.

The organisational structure of the local municipalities are shown in Table 42.

Table 42: Organisational structure

	Hessequa	Kannaland	Mossel Bay	George	Bitou	Knysna
Dept responsible for waste management	Technical Servies	Unknown	Unknown	Unknown	Unknown	Solid Waste Management
Designated WMO	No	Yes	No	Yes	Yes	No
Vacancies	3 Vacancies	Unknown	Unknown	Unknown	Designated WMO Air Quality Officer for Awareness (recycling, etc.)	Unknown
Staff training and development	Partially	Unknown	Unknown	Unknown	Ongoing	Unknown
Waste policy & by-laws aligned with Waste Act & NWMS	EDM Integrated Waste Management Forum compiled a generic Waste Management by-law to adopt the objects of the Waste Act. The by-law has not been effected in the local municipaliies and does not include the management of the regional facility.					
Private sector involvement (collection, disposal, waste minimisation)	N/A	Unknown	Unknown	Unknown	CBOs active in town area	Unknown

Source: Local Municipalities, 2015

4.7 OVERBERG DISTRICT MUNICIPALITY

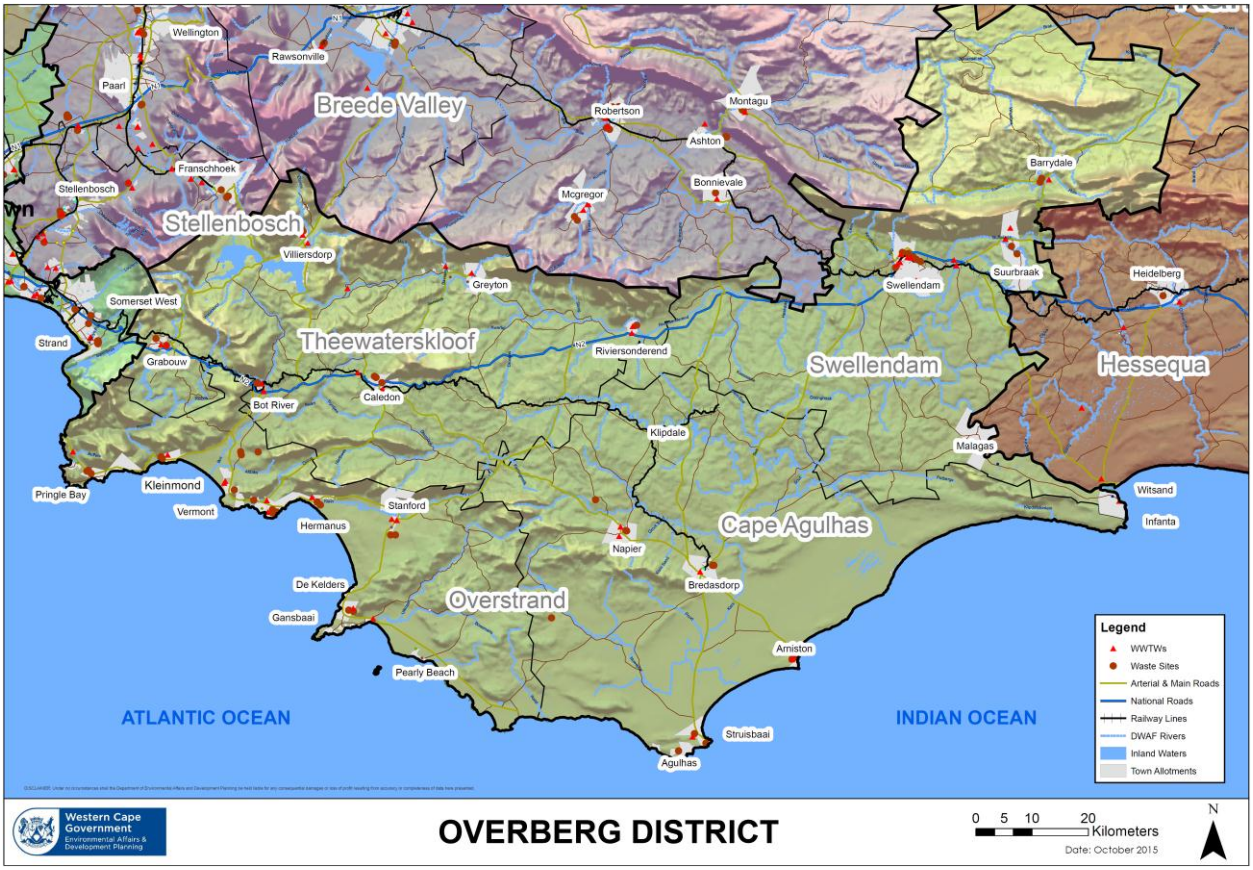


Figure 57: Geographical area of Overberg District Municipality

4.7.1 Geographical Area

The Overberg District Municipality (ODM) situated to the East of the Metropolitan area of Cape Town, along the southern coastal area of the province. The area is predominantly characterised by undulating plains and hills stretching from the Langeberg and Riviersonderend mountains in the north to the Atlantic and Indian Ocean coasts in the south. The district includes the Local Municipalities of Overstrand, Theewaterskloof, Cape Agulhas and Swellendam and covers an area of 12 241 km². The Atlantic and Indian oceans meet at the southernmost tip of Africa, at the Cape Agulhas in this district with a number of fishing villages and holiday resorts along the coastline. The Overberg experiences a typical Mediterranean climate, with mild, wet winters andwarm to hot, dry summers.

4.7.2 Demographics

This section provides the socio-economic characteristics of the population within the CWDM based on statistical data for factors such as population, economic status, level of education, income level and employment status. Where no waste quantities are available, population and socio-economic status data can be used to estimate current and future waste quantities generated within the district.

4.7.2.1 Population

Table 43 depicts the population growth in ODM and serves as an indication of demand for service delivery provision, which includes integrated waste management services.

Table 43: Population growth (2001 – 2011)

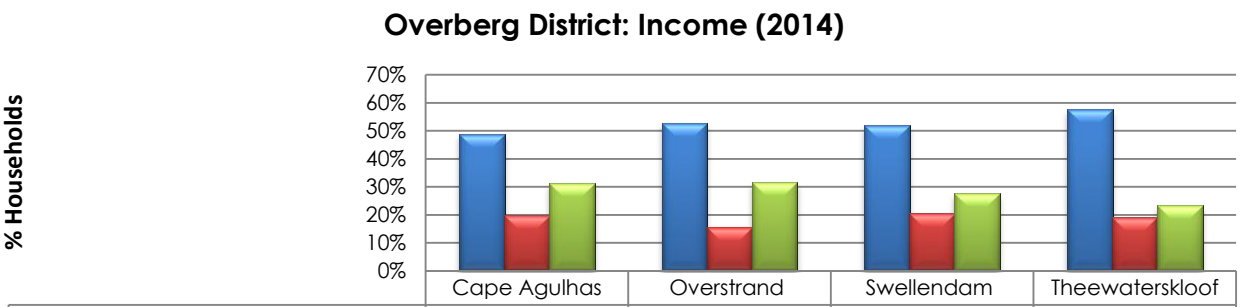
Municipality	2001	2011	Average annual growth (%)
Theewaterskloof	93,276	108,790	2.4
Overstrand	55,735	80,432	1.6
Cape Agulhas	26,183	33,038	3.7
Swellendam	28,077	35,916	2.4
Overberg	203,271	258,176	2.5

(Source: STATS SA)

The district has grown at a rate of approximately 2.5% between 2001 and 2011. Cape Agulhas Municipality experienced the highest growth (3.7%) and Overstrand Municipality the lowest growth rate (1.6%). Population growth in the ODM implies an increase in waste generation between 2001 and 2011.

4.7.2.2 Household income levels

Figure 58 depicts the various income levels in ODM. For 2014.



	Cape Agulhas	Overstrand	Swellendam	Theewaterskloof
Very Low & low income (R0 - R38 200)	49%	53%	52%	58%
Middle income (R38 201 - R76 400)	20%	16%	21%	19%
High & very high income (R76 401 or more)	31%	32%	28%	23%

Figure 58: Household income levels, 2014 (Source: Provincial Treasury, 2014)

The majority of households fall within the very low and low income groups (R0 – R38 200). The Overstrand and Cape Agulhas municipalities have the highest number of households within the high and very high income group within the district at 32% and 31% respectively.

4.7.2.3 Employment[47]

Figure 59 depicts the distribution of skills levels in the ODM for 2014. The employment status of the EDM indicates that the majority of employed people fall within the semi- and unskilled formal employment category (27 771), closely followed by the skilled formal employment category at 21 867 and only 8 829 people within the highly skilled formal employment category. The disparity between demand and supply for labour skills is indicated in the MERO studies and the MERO (2014) specifically highlights the oversupply of the semi- and unskilled employment category.

[47] Highly skilled occupations include managers, professionals and technicians, semi-and unskilled labour include domestic workers and other elementary workers *and skilled all other occupations, e.g. clerks, sales & services, skilled agricultural workers, crafts, machine operators, etc.* (StatsSA Labour Force Survey, LFS and QLFS).

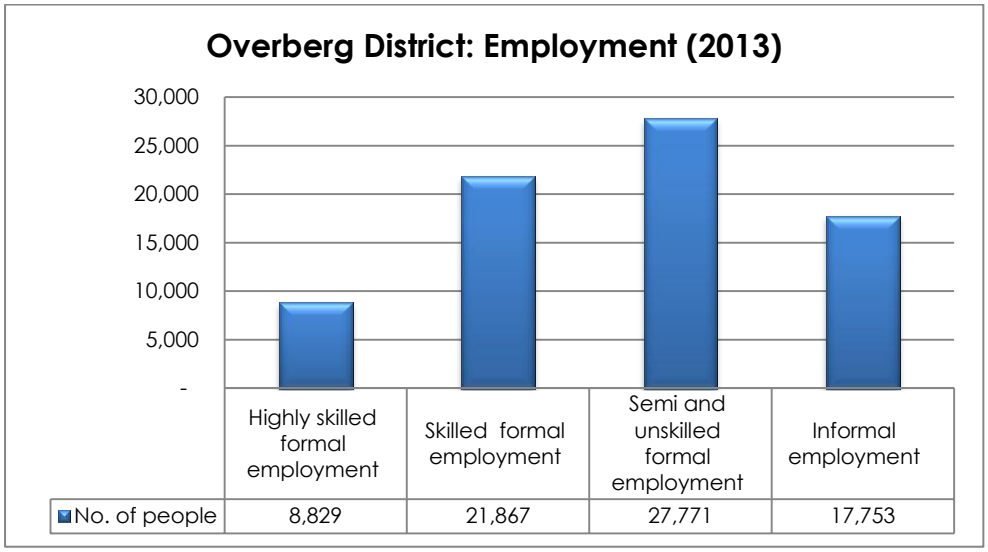


Figure 59: Employment (Source: MERO, 2014)

In the waste sector there are more people employed in the semi- and unskilled employment category than in the highly skilled and skilled employment category. However the MERO (2014) indicates that this is changing as the demand for the semi- and unskilled employment category is declining whereas the demand for highly skilled and skilled labour is growing. However, in the ODM, all the employment categories show a similar demand except for the highly skilled formal employment category.

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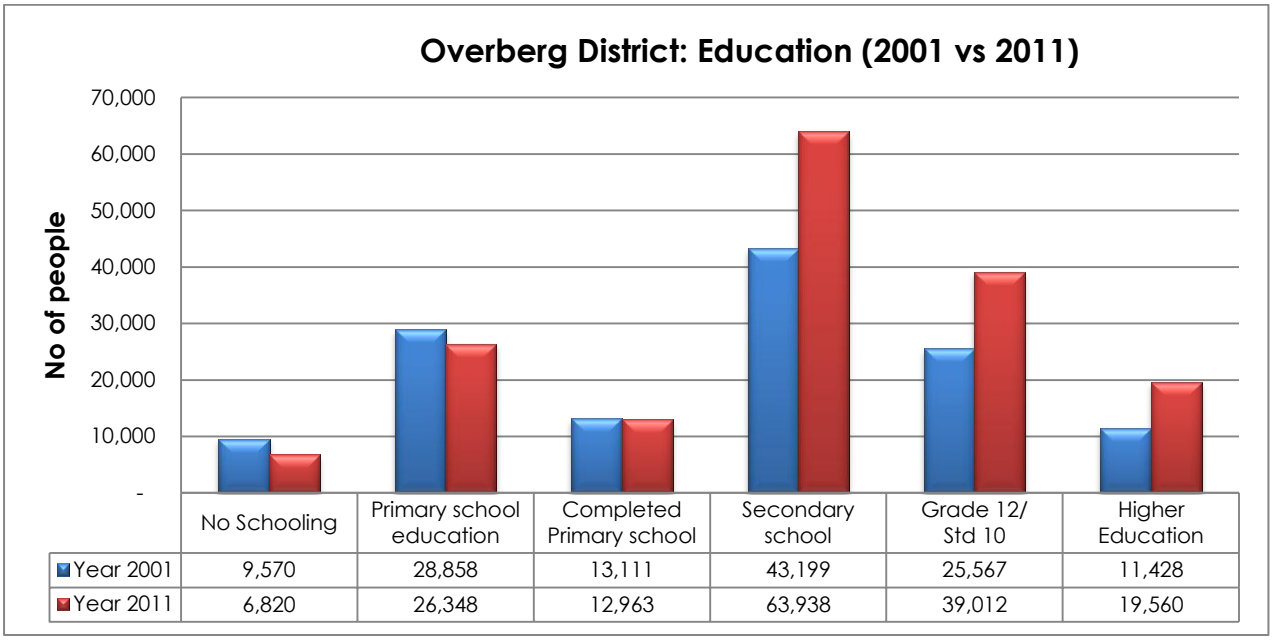
4.7.2.4 Level of education

The level of employment is considered as an indicator of the potential for employability, although this will be influenced by opportunities available within the district based on growth and development potential in the area. Figure 60 depicts the level of education in the ODM for the years 2001 and 2011. The Regional Development Profile documents (WCG: Provincial Treasury, 2012) emphasise the importance of education in improving access to employment opportunities and in sustaining as well as accelerating economic growth. Most people have received secondary schooling and passed Matric/Grade 12 than have completed higher education within the ODM.



	No Schooling	Primary school education	Completed Primary school	Secondary school	Grade 12/ Std 10	Higher Education
Year 2001	9,570	28,858	13,111	43,199	25,567	11,428
Year 2011	6,820	26,348	12,963	63,938	39,012	19,560

Figure 60: Education (2001 vs 2011)

4.7.2.5 Economic status

Figure 61 provides the real economic growth rate (percentage real GDPR growth) of the main sectors for the ODM. The tertiary sector dominates in the district contributing to 66% of the GDPR. Dominant sectors are Business Services (22.3%), Wholesale & Retail Trade (12.3%), and Agriculture, Forestry and Fishing at 11.2%. This gives an indication of the types of waste being generated within the district.

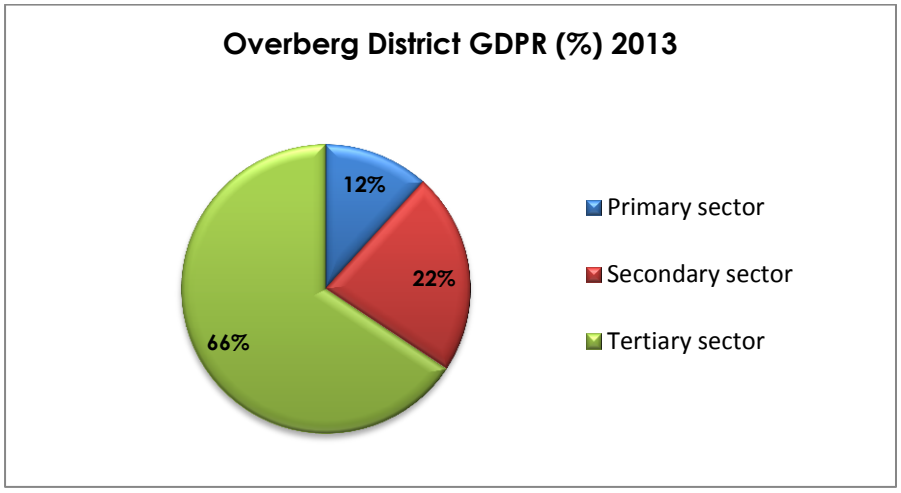


Figure 61: Sectors contributing to GDPR (MERO, 2014)

The detailed sector contributions to the Overberg GDPR are shown below.

Primary Sector	Agriculture, Forestry & Fishing (11.2%), Mining & Quarrying (0.1%), Water (0.4%)
Secondary Sector	Food, Beverages & Tobacco(5.1%), Textiles, Clothing & Leather Goods(0.2%), Wood, Paper, Publishing & Printing(0.9%), Petroleum Products, Chemicals, Rubber & Plastic (2.9%), Other Non-Metal Mineral Products (1.0%), Metals, Metal Products, Machinery & Equipment (1.6%), Electrical machinery & Apparatus (0.2%), Radio, TV, Instruments, Watches & Clocks (0.3%), Furniture & Other manufacturing (1.9%), Electricity (0.8%), Construction (7.6%)
Tertiary Sector	Transport Equipment (1.0%), Wholesale & Retail Trade (12.3%), Catering & accommodation Services (1.6%), Transport & Storage(3.7%), Communication (4.1%), Finance & Insurance (6.1%), Business Services (22.3%), Community, Social & Personal Services (4.0%), General Government (10.4)

4.7.2.6 Transport Infrastructure

The major road infrastructure is the N2 connecting the district with Cape Town in the west and the southern cape in the east.

4.7.2.6.1 Cape Agulhas

The road network is rural and the major roads are the north-south R319 and R317 and the northwest-southeast R316, which link most of the towns within the municipal area. A railway line connects the towns of Bredasdorp and Napier with Caledon in the west(2nd generation IWMP 2011).

4.7.2.6.2 Overstrand

The raod network is rural and the major roads are the R43 and R44, whcih link most of the towns within the municipal area. The R326 links Stanford with the N2 as well as teh R316 road between Caledon and Napier. The road infrastructure is currently in a good condition and as such does not pose a significant risk to the lifespan of the waste vehicles.There are no railway lines in the municipal area.The major roads are the R43 and the R44, which link most of the towns within the municipal area. The R326 links Stanford with the N2 as well as with the R316 road between Caledon and Napier. All waste is transported by road(3rd generation IWMP 2015).

4.7.2.6.3 Swellendam

The Municipality has good road and rail infrastructure and waste services are provided via the road. The only portion of road that is not conducive to waste collection service vehicles is the gravel road from the N2 to Malagas and Infanta. However, the economic activities and the small population of these two settlements do not justify the upgrading of this road which is approximately 67km (Draft 2nd gen IWMP July 2015).

4.7.2.6.4 Theewaterskloof

The road network is rural andthe major roads are the east-west N2 (Grabouw to Riviersonderend), the north-south R43 (Villiersdorp to N2 near Botrivier) and the R406 (linking Genadendal and Greyton with the N2) that links most of the towns within. A railway line also connects the towns of Grabouw, Botrivier and Caledon(2nd generation IWMP 2010). Waste from Villiersdorp is transported via the R43 and N2, all waste from Grabouw is transported via the N2 and R43, and waste from Botriver is transported via the R43 and all the waste from these areas is transported to the Karwyderskraal WDF.

4.7.2.7 Development profiles

Residential, commercial and industrial developments have an impact on the amount and types of waste generated as well as the different kinds of waste management services required within a municipal area. In order to facilitate integrated waste management planning, municipalities need to have a good understanding of the developmental and infrastructural needs within the municipal area. This together with the demographics of the municipal area is required for projecting current and future waste quantities. This section provides information on housing backlogs and delivery programmes for the Overberg District Municipality and has been sourced from the 2014/15 IDP Reviews for the district and local municipalities as well as housing demand and delivery information sourced from the Western Cape Government: Department of Human Settlements.

4.7.2.7.1 Housing type

The inhabitants of the ODM reside in a variety of housing types or dwellings. Statistics South Africa (Census 2011) defines the three main dwelling types as follows:

- Formal dwellings include a house or brick/concrete structure on a separate stand or yard or on a farm, flat or apartment in a block of flats, cluster house in a complex, townhouse (semi-detached house in a complex), semi-detached house, house/ flat/ room in a backyard and a room/ flatlet on a property or a larger dwelling/ servants' quarters/ granny flat;
- Informal dwellings include a backyard shack, a shack not in a backyard but in an informal/ squatter settlement (informal residential) or on a farm; and
- Traditional dwellings include huts and structures made of traditional materials such clay, mud, reeds or other locally available natural materials e.g. homesteads/ rondavels.

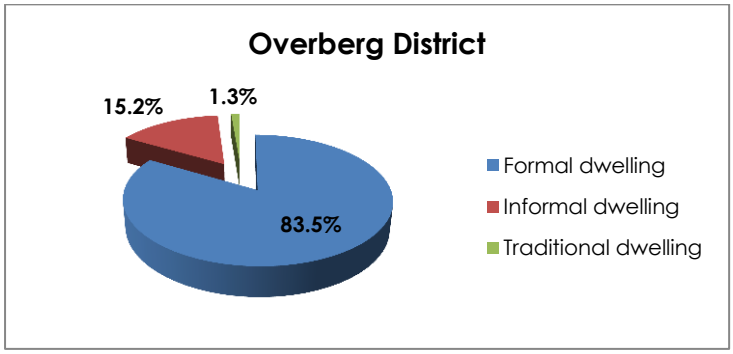


Figure 62: Access to housing

Figure 62 depicts the dwelling types and indicates the quality of housing in relation to human settlements. The majority of households in the ODM are in formal dwellings (84%) with 16% in informal and traditional dwellings.

4.7.2.7.2 Housing demand and delivery

The Western Cape Department of Human Settlements (Raynita Robertson perscomm, 2015) highlights that Housing Demand databases within municipalities often include registered persons who may be residing within one District but have opted to register for a house in a different District. Figure 63 depicts the number of registered persons (24 025) on the Overberg Housing Demand database. The Theewaterskloof Municipality has the greatest number of persons (10 570) registered on the Housing Demand database with the lowest number of registered persons (3 631) in the Cape Agulhas Municipality (Figure 63).

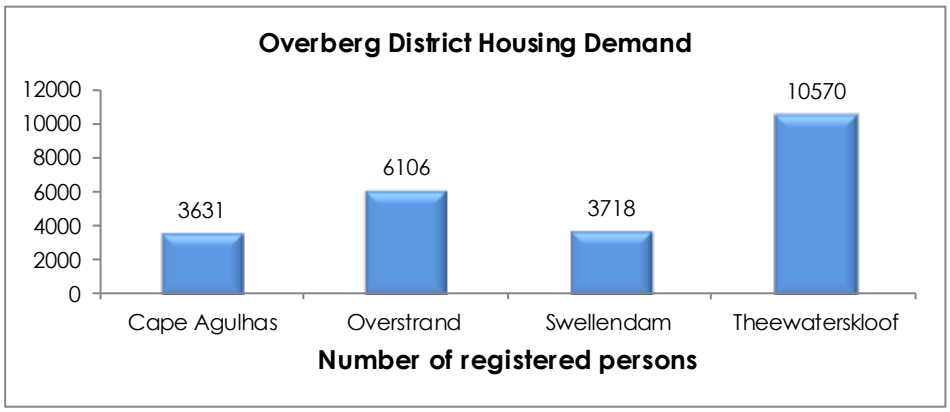


Figure 63: Housing Demand (as at July 2015)

Figure 64 depicts the estimated housing that can be delivered between 2009 and 2015 based on available Division of Revenue Act (DORA) allocation and it also shows the potential housing that can be delivered between 2016 and 2021 with consideration for DORA allocation as well as project readiness. The project readiness is based on the following:

- Land obtained
- EIA Authorisation
- Consideration for bulk capacity
- Department of Human Settlements Approval
- Council Approval

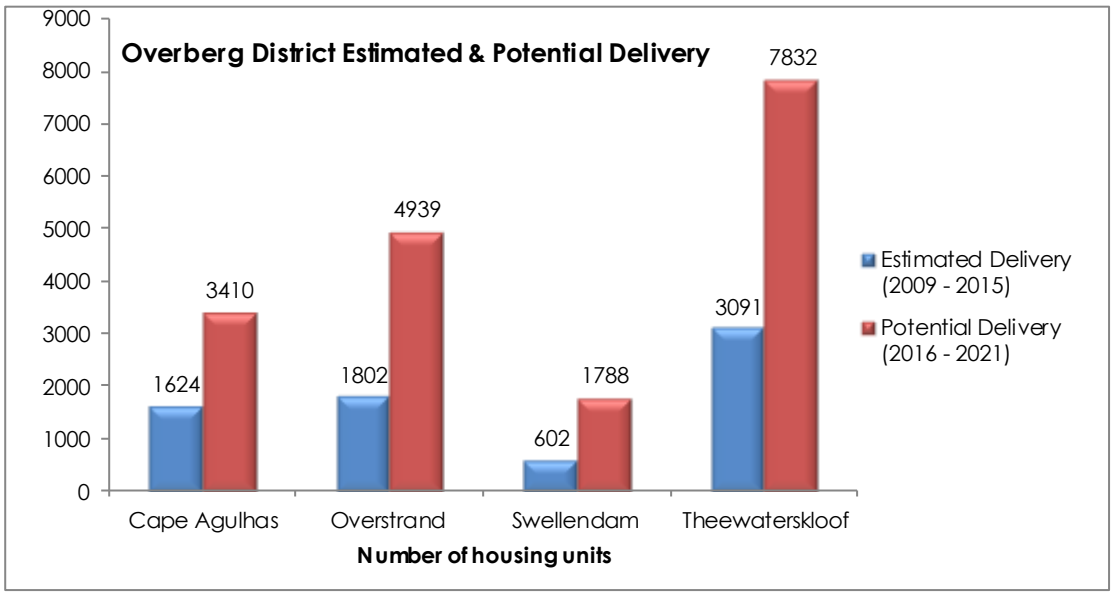


Figure 64: Estimated & Potential Housing Unit Delivery

The current housing backlog and IDP housing projects are shown in Table 48.

Table 44: Housing Backlog and IDP PROJECTS (IDP Review, 2014/15)

Municipality	Housing Backlog	Housing projects	Budgeted/ Estimated Cost
Cape Agulhas	4 221 applications	380 plots	DHS
Overstrand	6 575 units	Housing-related projects	R55 955 567
		700 units	R12 480 400
Swellendam	3 241 units (2013)	393 sites	No clear indication
Theewaterskloof	13 681 applications	14 projects	R47 622 000

The municipal IDP Reviews (2014/15) highlights the following challenges regarding housing backlogs:

- Overstrand Municipality's current housing delivery plans cannot address the housing needs of the municipal area, as the growing demand continues to exceed supply (insufficient DoRA allocations) as much of this demand is mainly in informal structures (informal settlements and backyards),
- Swellendam Municipality is challenged with regards to the availability of land for housing and no subsidised housing development is proposed in areas indicated as sensitive in the Breede River Estuary Management Plan, and
- Theewaterskloof Municipality has identified limited funds, land availability and the eradication of informal settlements as well as the sourcing of alternative housing for farm workers as major challenges.

4.7.2.8 Housing delivery and Service levels

This section focuses on how the current and future housing status will affect the provision of the waste collection service. The ODM service levels data used in this section, basic services (86%) and free basic services (80%), was obtained from the Department of Local Government and provides the status of service levels as at June 2015. The data, however, does not provide specifics with respect to service provision to informal dwellings, particularly informal settlements.

4.7.2.10.1 Cape Agulhas Municipality

The service levels for the Cape Agulhas are at 100% for both basic and free basic services as at June 2015. The municipality has the lowest number of people (3 631) registered on the housing demand database as at July 2015. The estimated housing delivery for Cape Agulhas between 2009 and 2015 was 1 624 and the potential housing delivery from 2016 to 2021 is 3 410. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.7.2.10.2 Overstrand Municipality

The service levels for Overstrand are at 89% for basic services and at 100% for free basic services as at June 2015. The municipality hads 6 106 people registered on the housing demand database (as at July 2015) and an estimated delivery of 1 802 houses between 2009 and 2015. Overstrand also has a potential to deliver 4 939 houses from 2016 to 2021. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a basic service to the 11% of households without a service currently,
- improving the waste collection service, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

4.7.2.10.3 Swellendam Municipality

The service levels for Swellendam are at 83% for basic services and at 100% for free basic services as at June 2015. The Municipality has 3 718 people registered on the housing demand database (as at July 2015). Swellendam had an estimated delivery of 602 houses between 2009 and 2015 and a potential to deliver 1 788 houses from 2016 to 2021, both the lowest delivery estimates for the district. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a basic service to the 17% of households without a service currently,
- improving the waste collection service, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

4.7.2.10.4 Theewaterskloof Municipality

The service levels for Theewaterskloof are at 80% for basic services and at 45% for free basic services as at June 2015. The Municipality has the highest number of people (10 570) registered on the housing demand database (as at July 2015) in the district. Theewaterskloof had an estimated delivery of 3 091 houses between 2009 and 2015 and a potential to deliver 7 832 houses from 2016 to 2021, the highest delivery estimates for the district. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a basic service to the 20% of households without a service currently,
- providing a free basic service to the 55% of households without a service currently,
- improving the waste collection service, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

All the local municipalities within the ODM either provide a communal waste collection service through skips and others provide a bag containment service in informal settlements. In formal dwellings, a bag containment is usually provide in low income housing and a wheelie bin containment service is usually provided in middle or high income housing. Municipalities might improve services by moving from communal waste collection to the provision of bags or from a bag containment service to the provision of wheelie bins.

Municipalities are faced with the challenge of increasing informal settlements and as a result are struggling to meet the demand for delivery of low income housing. The National Department of Human Settlements has the Upgrading Informal Settlements Programme (UISP), which is an initiative to aimed at upgrading informal settlements through various grants. The UISP aims to provide and improve basic services to informal settlements as well as provide secure tenure to ensure that informal settlements are in well-located and legal land. The provision of basic services includes the upgrade of a communal waste collection service to a household refuse collection or the provision of a bag containment service.

4.7.3 Waste generation areas

4.7.3.1 General waste

Waste generation rates vary between municipalities and the following rates, as reflected in the local municipal IWMPs were used.

- Swellendam Local Municipality – 0.96kg/c/day
- Theewaterskloof Local Municipality – 0.55kg/c/day
- Overstrand Local Municipality – 1.67kg/c/day
- Cape Agulhas Local Municipality – 0.53kg/c/day

Based on the above rates it is estimated that waste generation figures in ODM, using the 2015 population figures as baseline, will increase by 7.1% by 2020, 19.4% by 2030 and 30.2% by 2040. The projected general waste generation figures general waste from households, commercial and industrial general waste. In some of the municipalities building rubble, recyclables and public cleansing waste are also included.

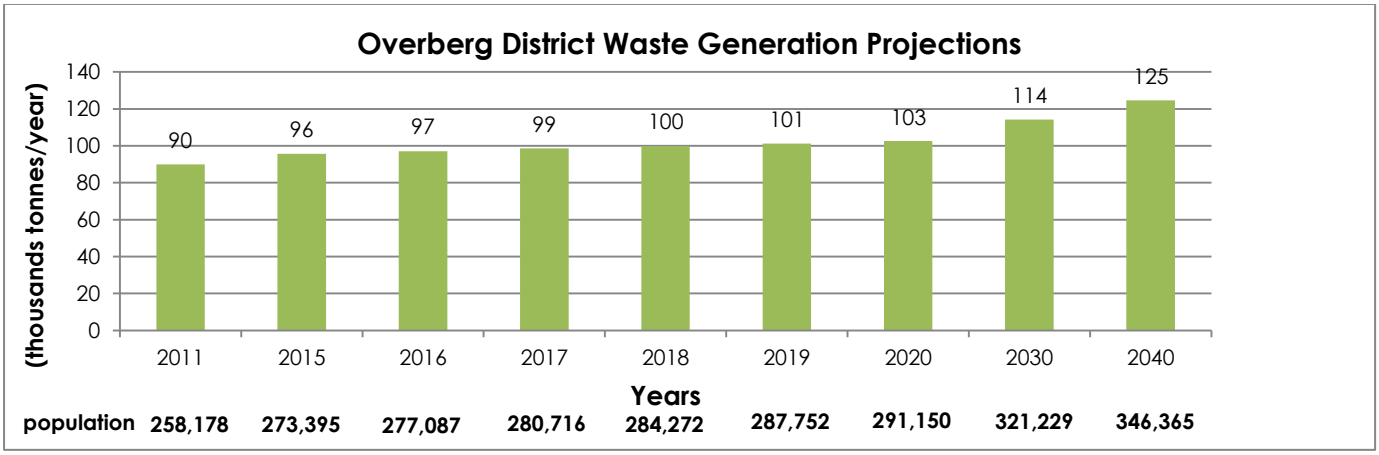


Figure 65: Waste generation quantities 2015 – 2040

4.7.3.2 Waste composition

4.7.3.2.1 General waste

The largest component of the DEADP waste characterisation study conducted in 2007 was organic waste (44%) followed by paper and cardboard (27%) and plastics (18%). A waste study conducted by DEADP in Swellendam during 2014 showed organics (food and greens) to be at 35% ; paper and cardboard a combined 20% and plastics (soft plastic and plastic bottles at 18%). In February 2016 a waste charcaterisation done in Elim, Cape Agulhas had organics(food and greens) at 37%, plastics at 7% and paper and cardboard at 11%.

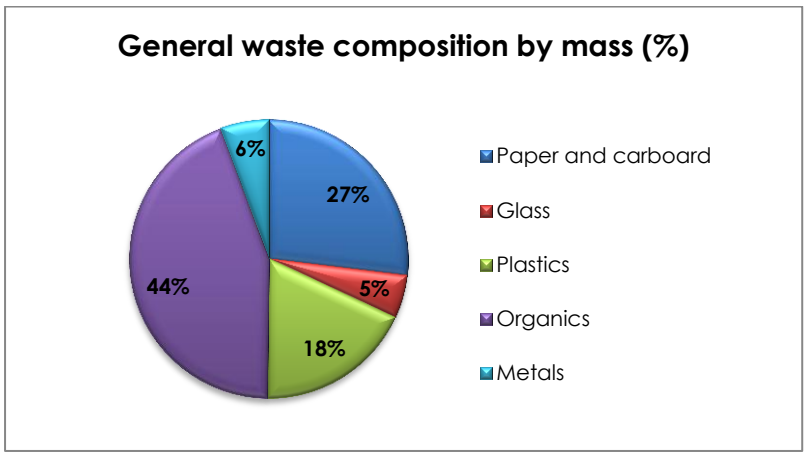


Figure 66: General waste composition by % mass

4.7.3.3 Health care risk waste

The Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007) defines Health Care Risk Waste (HCRW) as that portion of health care waste that is hazardous and includes infectious waste, pathological waste, sharp waste, pharmaceutical waste, genotoxic waste, chemical waste, waste with heavy metals, radioactive waste, and any other health care waste which is defined as hazardous in terms of the Waste Management Series: Document 1: Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, as published by the Department of Water Affairs and Forestry.

HCRW is either incinerated as a means of disposal or treated through Electro Thermal Destruction. Incineration of HCRW is one of the most effective means to eliminate the risks posed by health care risk waste and also reduces the overall volume of the waste. HCRW is mainly removed to be treated and disposed by service providers who have to be registered on the Western Cape Integrated Pollutant and Waste Information System (IPWIS) as required in terms of the National Environmental Management: Waste Act: National Waste Information Regulations, January 2013. The HCRW Generators are also required to register and report to the provincial IPWIS, which then exports the data onto the national waste information system (SAWIS).

According to the IPWIS (October 2015), 58 governmental, non-governmental and private healthcare facilities within ODM have registered and 24 are reporting on the provincial system to date.

Table 45 depicts the number and types of healthcare facilities available across ODM.

Table 45: Healthcare facilities

Community health centres	Community day centres	Number of PHC clinics - fixed	Number of PHC clinics - non-fixed (satellites)	Number of PHC clinics - non-fixed (mobiles)	Number of district hospitals	Number of regional hospitals	Total
0	1	22	11	14	4	0	52

Source: WCG Provincial Treasury - Socio-economic Profile 2014 Working Paper

The amount of HCRW reported on the IPWIS for the period January 2014 to August 2015 amounted to 372.82 tonnes. Figure 67 provides the percentage contribution of HCRW across ODM.

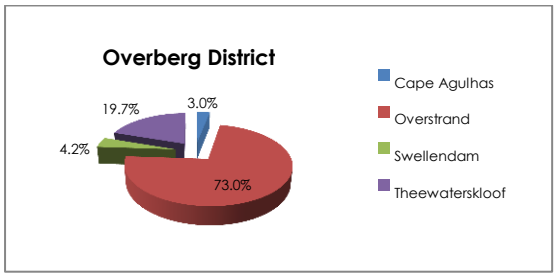


Figure 67: Healthcare risk waste percentage distribution

4.7.3.4 Hazardous Waste

No information provided in the local IWMPs.

4.7.3.5 Problem waste streams

4.7.3.5.1 Agricultural waste

The main agricultural commodoties in the district are dryland cereals, vegetables and vegetable oils[48].

There is a lack of information on the liquid and solid waste generated from these production processes.

[48] Western Cape Government: Water Infrastructure & opportunities for agriculture & agri-processing in the Western Cape (2015)

4.7.3.5.2 Sewage sludge

Table 50 depicts sewage sludge management in the ODM.

Table 46: Wastewater Treatment Works and sewage sludge disposal

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Overstrand	Gansbaai WWTW	80 tonnes per month	Screening containers disposed of at Vissershok WDF. Sludge is disposed of at two WDFs that have liners and leachate dams.
	Hawston WWTW		Screening containers disposed of at Vissershok WDF. Sludge is disposed of at two WDFs that have liners and leachate dams.
	Hermanus WWTW		Screening containers disposed of at Vissershok WDF. Sludge is disposed of at two WDFs that have liners and leachate dams.
	Kleinmond WWTW		Screening containers disposed of at Vissershok WDF. Sludge is disposed of at two WDFs that have liners and leachate dams.
	Stanford WWTW		Screening containers disposed of at Vissershok WDF. Sludge is disposed of at two WDFs that have liners and leachate dams.
Theewaterskloof	Botrivier	48m³/year	Sludge is mechanically dewatered on a belt press and buried on site.
	Caledon	300m³/year	Sludge is mechanically dewatered on a belt press and buried on site.
	Genadendal	288m³/year	Sludge is buried on site.
	Grabouw	648m³/year	Some sludge is buried on site and some is composted.
	Greyton	648m³/year	Sludge is buried on site.
	Riviersonderend	288m³/year	Sludge is buried on site.
	Villiersdorp	180m³/year	Sludge is buried on site.

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Cape Agulhas	Struisbaai	Sludge quantities unknown	Dried sludge is kept on site, not sure what to do with it at the moment.
	Bredasdorp	Sludge quantities unknown	Dried sludge is kept on site, not sure what to do with it at the moment.
	Arniston	Sludge quantities unknown	Dried sludge is kept on site, not sure what to do with it at the moment.
	Napier	Sludge quantities unknown	Dried sludge is kept on site, not sure what to do with it at the moment.
Swellendam	Barrydale	No information received	The sludge is currently being buried on-site.
	Buffelsjag	No information received	The sludge is currently being buried on-site.
	Kliprivier	No information received	The sludge is currently being buried on-site.
	Koornland	No information received	The sludge is currently being buried on-site.
	Suurbraak	No information received	The sludge is currently being buried on-site.

4.7.3.5.3 Abattoir waste

The following information was obtained regarding management of abattoir waste in CKDM.

Table 47: Abattoir waste

Municipality	Number of abattoirs	Disposal methods	Disposal quantities
Theewaterskloof	1	Vissershok WDF	Unknown
Cape Agulhas	1	The municipality have an agreement with a private landowner to dispose of on his farm.	Unknown
Swellendam	2	The Abattoirs dispose of their waste by transport to the Cape Town Metropolitan Area. There are no agreements between the existing two abattoirs and the Municipality.	Quantities per month/annum are not available

4.7.3.5.4 Tyres

Handling of tyre waste and quantities are unknown due to limited reporting from industries.

4.7.4 Waste avoidance, reduction and recycling[49]

The District Municipality coordinates the Regional Waste Forum to create a platform for Local Municipalities to discuss waste related matters and share best practice models. An office recycling programme was started in the Overberg District Municipality buildings.

4.7.4.1 Overstrand Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- Awareness is raised through the municipal newsletter.
- School visits are done to inform children about waste management, recycling, composting and the importance of diversion from landfill.
- The media is also used to publish awareness raising notifications to the public.
- The Waste Management unit also responds to requests for presentations/ awareness raising from various organisations. Awareness raising is also done with the children at the swop shops when they bring their recyclables.
- Clean up campaigns are done in collaboration with the District Municipality. Contractors appointed for area cleaning also do awareness raising for littering and illegal dumping.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- Swop shops are supported by transporting the recovered materials from the swop shop to the recyclers' premises.
- Waste is separated at source throughout the whole of Overstrand Municipality by means of a two-bag system.
- Drop-off facilities are available for the public to drop their waste.
- Materials recovery is supported by the municipality and takes place at two MRFs which is contracted to the municipality.
- Garden waste is chipped and composted for diversion from landfill.

Job creation

- Youth Jobs in Waste workers were appointed at the Municipality.
- Contractors were appointed for a three year term to clean streets and open spaces as well as raise awareness for littering and illegal dumping.

[49] Greenest Municipality Competition: Waste Management Report 2015/2016

4.7.4.2 Cape Agulhas Municipality

Waste awareness

- The Youth Jobs in Waste workers and EPWP workers conducts door-to-door campaigns on waste and runs a school awareness programme.
- The municipality conducts waste awareness programmes at schools and with residents.

Waste minimisation

- The municipality has appointed a private contractor to establish and manage a recycling project which includes a swop shop in the low income residential areas over a period of 3 years.
- There is a split bag system implemented in the residential areas.
- There are recycling igloos in public areas and the municipality supports waste recovery.
- Building rubble is crushed before disposal at WDFs.

Job creation

- Six EPWP projects provide temporary employment for unemployed and disabled residents. Tasks include area cleaning, sorting and packaging of recyclables.

4.7.4.3 Theewaterskloof Municipality

Waste awareness

- TEDCOR was used to assist with a once off awareness programme at schools.

Waste minimisation

- Chipping and composting of green waste in Grabouw RTS and recycling in which a private company collects recyclables from business offices.

Job creation

- Cleaning of streets by making use of EPWP workers.

4.7.4.4 Swellendam Municipality

Waste awareness

- The Municipality does not implement any awareness-raising initiatives.

Waste minimisation

- The Municipality does not implement any minimisation projects.

Job creation

- The Municipality employs TEDCOR workers.

4.7.4.5 Waste information[50]

4.7.4.5.1 Cape Agulhas Municipality

The municipality reports on waste types and quantities received and reports at a 99% compliance rating

4.7.4.5.2 Overstrand Municipality

All waste information are reported to the Department.

4.7.4.5.3 Swellendam Municipality

Waste information was reported but much improvement is needed as the compliance rating in terms of reporting is at 6%.

4.7.4.5.4 Theewaterskloof Municipality

The municipality reported waste information for this year at a compliance rate of 48%.

4.7.5 Treatment and disposal

Figure 68 depicts compliance scores at WMFs that were audited in the 2015/16 financial year. Key challenges experienced at the WMFs are lack of cover material, windblown litter, fencing, storm water management, limited machinery and component security and operational staff. Burning of waste takes place at most facilities. Facilities which yielded red ratings (0 -64%) and amber ratings (65 – 84%) will receive priority for the 2016/17 financial year.

Compliance scores ratings:

Total	Status Indicator		Action
85 – 100 %	Green	X	Small changes needed
65 – 84 %	Amber		Improvements required
0 – 64 %	Red		Major improvements required

[50] Greenest Municipality Competition: Waste Management Report 2015/2016

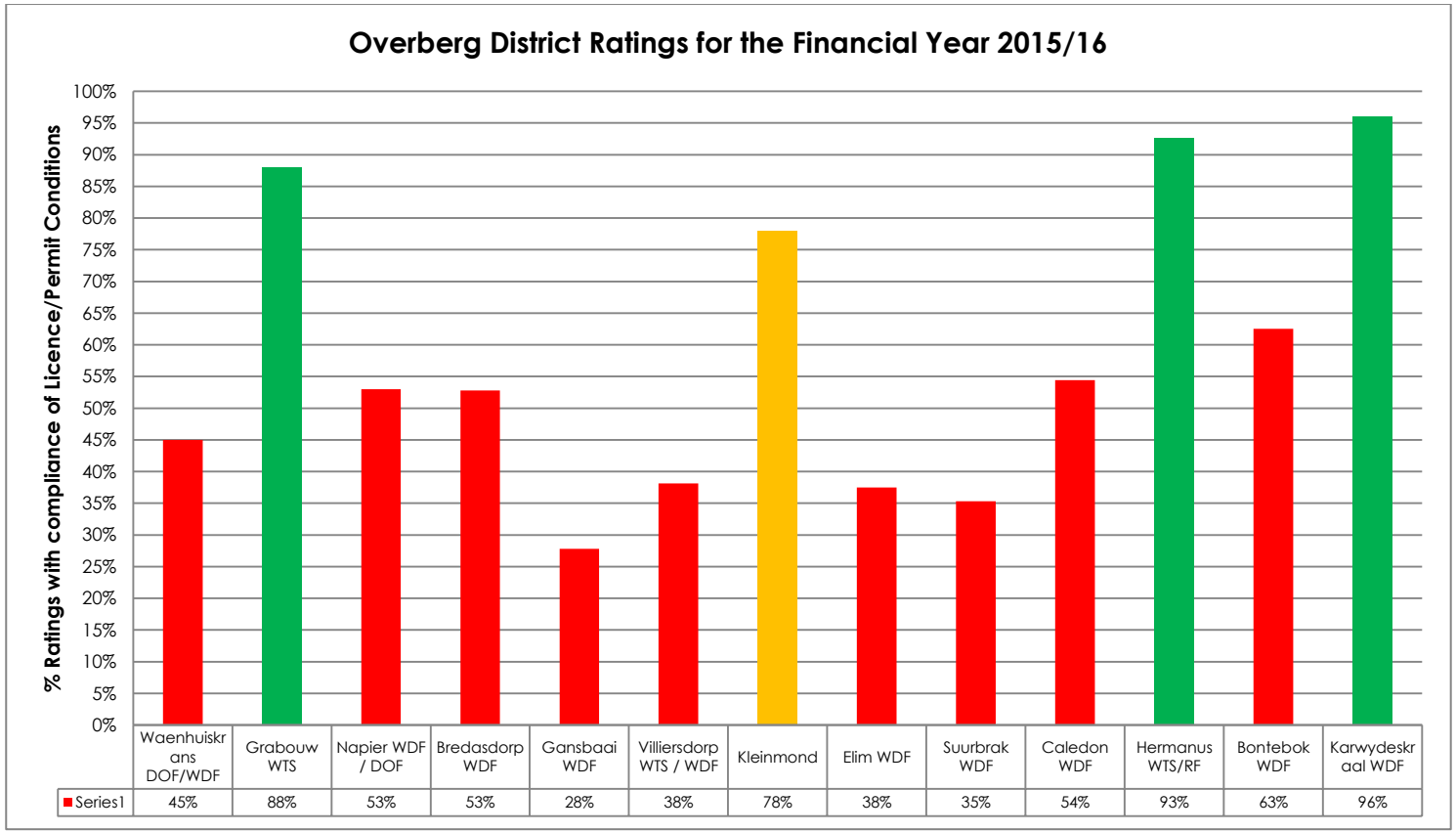


Figure 68: Compliance audit outcomes of Waste Management Facilities

The status quo of waste management facilities in ODM is provided in Table 48.

It should be noted that the facilities in Table 48 with decommission licence type statuses isssued in 2014/15 fiscal year are issued with licence conditions to commence with decommissioning within a 5 year period. This condition was implemented to allow the Municipalities to plan and prepare alternatives for the closure of the waste disposal facilities.

Table 48: Conditions of Waste Management Facilities

Municipalities	Waste Management Facility	Classification	Licence Type	Airspace availability (incl. years)	Types of Waste
Cape Agulhas	Bredasdorp WDF	G:S:B-	Operation	Expected lifespan of extended area with no waste reduction& assumed increase of 3% p/a is 2066.	General waste
	Elim WDF	G:C:B-	Operation	Unknown	
	Agulhas WDF	G:C:B-	Closure	n/a	
	Struisbaai WDF	G:C:B-	Closure	n/a	
	Napier WDF	G:C:B-	Closure	n/a	
Swellendam	Suurbrak WDF	G:S:B-	Operation	Unknown	Garden waste
	Bontebok WDF	G:M:B+	Operation	Unknown	
	Berrydale WDF	G:C:B-	Decommission (2014/15)	n/a	
	Infanta WDF	G:C:B-	Operation	Unknown	
Karwyderskraal Regional Site	Karwyderskraal WDF	G:M:B+	Operation	~ 300 000m^3 (2015 data).	Garden waste & building rubble
Theewaterskloof	Caledon WDF	G:S:B-	Operation	Capacity until 2016 (2010 data)	
	Villiersdorp RTS	n/a	Operation	n/a	
	Genadendal WDF	G:C:B-	Decommission (2014/15)	n/a	
	Grayton WDF	G:C:B	Decommission (2014/15)	n/a	
	Botrivier WDF	n/a	Decommission (2014/15)	n/a	
	Riviersonderend WDF	n/a	Decommission (2014/15)	n/a	

Municipalities	Waste Management Facility	Classification	Licence Type	Airspace availability (incl. years)	Types of Waste
Overstrand	Gansbaai WDF	G:M:B-	Operation	Estimated at 919 700m^3, full capacity by 2031(2015 data)	General household, commercial &industrial waste, garden waste, building rubble
	Hermanus RTS		Operation	n/a	
	Kleinmond RTS	G:C:B+	Closure	n/a	
	Fishershaven Drop-Off			n/a	
	Voelklip Drop Off			n/a	
	Standford Drop Off			n/a	
	Pearly Beach Drop Off			n/a	
	Kleinmond Drop Off		Operation	n/a	
	Onrusrivier WDF	n/a	Decommission	n/a	
	Karwyderskraal WDF	G:M:B+	Operation	Unknown	
	Betty's Bay WDF	G:C:B+	Closure	n/a	
	Pearly Beach WDF	G:C:B+	Closure	n/a	
	Voelklip WDF	G:C:B-	Closure	n/a	
	Hermanus WDF	G:M:B+	Operation	Unknown	
	Fishershaven WDF	n/a	Decommission	n/a	
	Kleinmond WDF	G:C:B+	Closure	n/a	
	De Rust WDF	G:C:B+	Operation	Unknown	
	Standford WDF	G:S:B+	Operation	Unknown	

4.7.5.1 Regionalisation of waste management

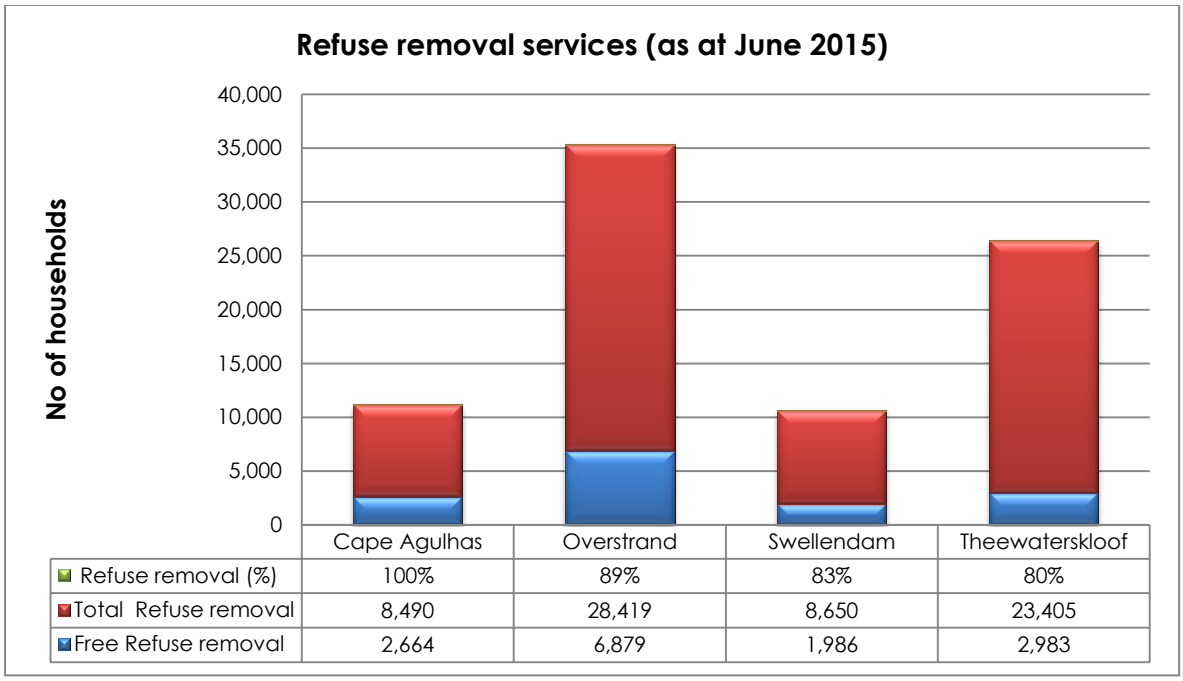
ODM has a regional waste disposal facility called Karwyderskraal. The facility is currently under construction to accept additional waste from Theewaterskloof Municipality.

4.7.6 Current and upcoming alternative waste treatment options

There are currently no upcoming alternative waste treatment options planned in the district.

4.7.7 Waste collection services

Figure 69 depicts the level of domestic waste collection services in ODM as at June 2015. The level of services varies between 80% to 100%. There is much room for improvement in providing refuse removal services to communities being serviced by the local municipalities.



	Cape Agulhas	Overstrand	Swellendam	Theewaterskloof
Refuse removal (%)	100%	89%	83%	80%
Total Refuse removal	8,490	28,419	8,650	23,405
Free Refuse removal	2,664	6,879	1,986	2,983

Figure 69: Refuse removal services as at June 2015 (Source: Provincial Treasury, 2015)

4.7.7.1 Public cleansing and illegal dumping

Illegal dumping falls within the ambit of the responsibilities of the local municipalities and the ODM is not involved with enforcement of the local by-laws.

The following has been reported in the various municipalities:

- Cape Agulhas R 360 000 (2013/14)
- Overstrand – unknown
- Swellendam – unknown
- Theewaterskloof - unknown

4.7.8 Cost of existing waste management system

Numerous attempts were made to obtain financial information around solid waste management from most local municipalities, however, this has been unsuccessful, with the exception of a few. Consequently, DEADP obtained financial OPEX and CAPEX (audited) for all local municipalities from Provincial Treasury. It should be noted that these are financial summaries of waste management services.

Table 49: CAPEX for ODM (2011/12 – 2014/15)

CAPEX	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Overberg DM	10	Unknown	2	Unknown
Cape Agulhas	9 011	10 773	2 501	Unknown
Overstrand	196	5 528	3 041	Unknown
Swellendam	Unknown	Unknown	7	Unknown
Theewaterskloof	808	347	Unknown	Unknown
Total	10 025	16 648	5 551	Unknown

Source: Provincial Treasury

Table 50: OPEX Revenue for ODM (2011/12 – 2014/15)

OPEX- Revenue	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Overberg DM	1 790	16	11	503
Cape Agulhas	8 981	9 806	10 773	13 316
Overstrand	39 605	46 758	53 066	60 286
Swellendam	5 520	5 398	22 241	8 363
Theewaterskloof	20 277	23 190	25 517	30 202
Total	76 174	85 167	111 608	112 669

Source: Provincial Treasury

Table 51: OPEX Expenditure for ODM (2011/12 – 2014/15)

OPEX- Expenditure	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Overberg DM	2 467	1 897	1 480	797
Cape Agulhas	7 350	8 420	11 952	13 016
Overstrand	37 573	40 102	36 085	101 052
Swellendam	5 745	5 515	4 559	5 701
Theewaterskloof	23 538	22 246	24 884	25 925
Total	76 673	78 180	78 962	146 492

Source: Provincial Treasury

Figure 70 shows the OPEX Revenue vs OPEX Expenditure for waste management services in the various local municipalities. The Overstrand municipality has the biggest deficit whilst the other municipalities are able to meet their expenses.

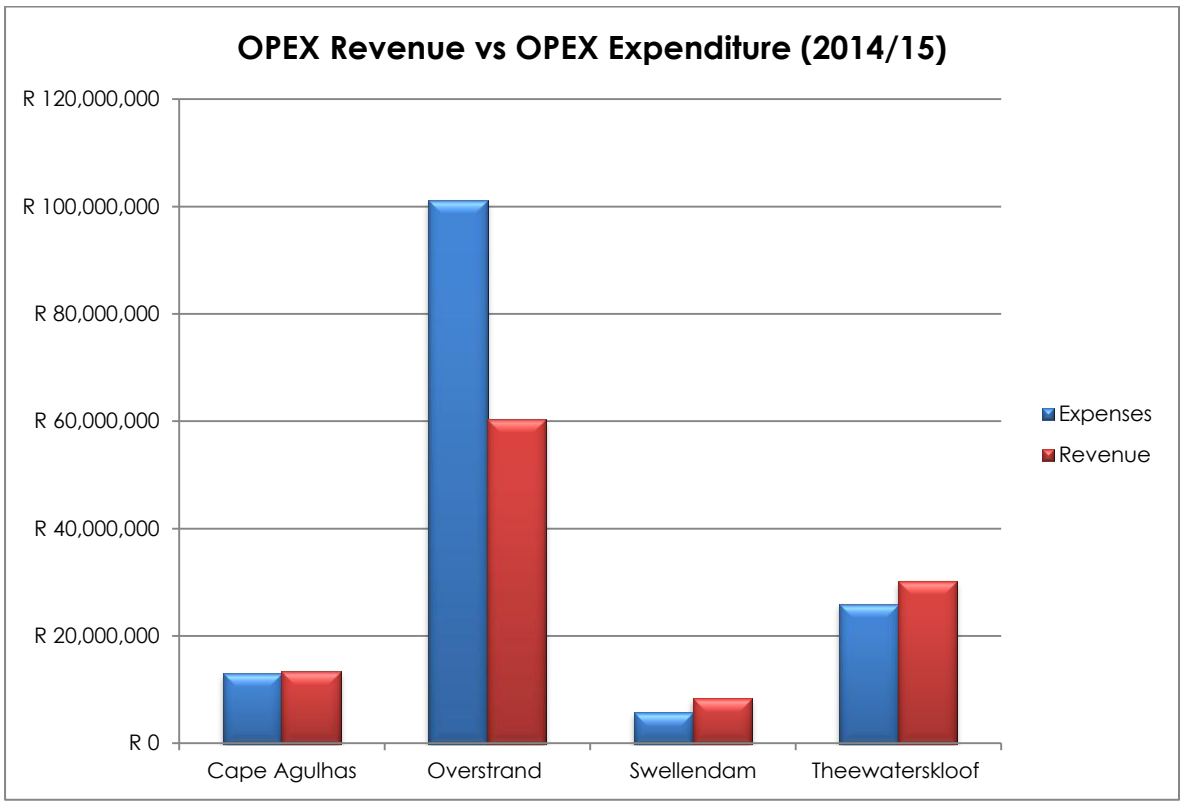


Figure 70: OPEX Revenue vs OPEX Expenditure: 2014/15 (source: Provincial Treasury, 2014/15)

4.7.9 Governance

The district has a designated WMO who manages all district waste related matters at the Regional Waste Forum. The forum creates a platform for local municipalities to discuss waste related matters and share best practice models.

The organisational structure of the local municipalities is shown in Table 52.

Table 52: Organisational structure

	Theewaterskloof	Overstrand	Cape Agulhas	Swellendam
Dept responsible for waste management	Waste Management	Community Services (collection & operation of RTSs and drop offs. Infrastructure and Planning (awareness & permit conditions of premises & contract management for contractors working for solid waste.	Technical Services	Shared service: Engineering Services (collection of household, commercial and building rubble) and Community Services (collection of garden greens)
Designated WMO	No	Yes	Yes	No
Vacancies	Unknown	2 Job levels 0 – 3 3 1 Job levels 4-6	Unknown	Unknown
Staff training and development	Unknown	Ongoing	Unknown	Unknown
Waste policy & by-laws aligned with Waste Act & NWMS	Waste by-law is outdated (2005) and not aligned with the Waste Act & NWMS	Waste By-law is aligned with Waste Act	Waste by-law is outdated (2005) and not aligned with the Waste Act & NWMS	Waste By-law is aligned with Waste Act
Private sector involvement (collection, disposal, waste minimisation)	Unknown	2 MRFs run by private person 2 WDFs managed by private contractors Haulage of waste from drop offs and RTSs by private contractor	Unknown	Unknown

Source: Local Municipalities, 2015

4.8 WEST COAST DISTRICT MUNICIPALITY

Figure 71: Geographical area of West Coast District Municipality

4.8.1 Geographical Area

The West Coast District Municiplity (WCDM) is situated to the north of the Cape Town Metropolis, north-east of the Cape Winelands district and borders the Northern Cape. The district has mountainous landscape in the east and a coastal plain to the west and covers an area of 31 119 km^2. Five local municpalitites make up the district: Matzikama, Cederberg, Bergrivier, Saldanha Bay and Swartland. The area is noted for its veld flowers, fruit and sheep farming. The main industry is the agricultural sector with the tourism sector also growing fast. The district has a mediterranean climate with hot and dry summer days and rainfall is predominantly in the winter months.

4.8.2 Demographics

This section provides the socio-economic characteristics of the population within the WCDM based on statistical data on factors such as population, economic status, level of education, income level and employment. Where no waste quantities is available, population and economic status data can be used to estimate current and future waste quantities generated within the district.

4.8.2.1 Population

Table 53 depicts the population growth in CWDM and serves as an indication of demand for service delivery provision, which includes integrated waste management services.

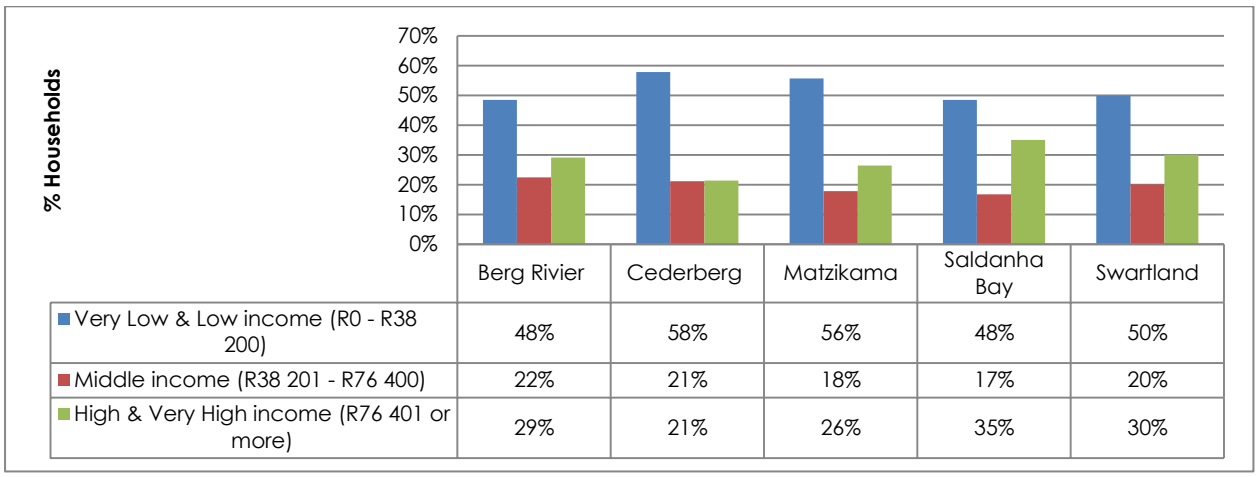
Table 53: Population growth (2001 – 2011)

Municipality	2001	2011	Average annual growth (%)
Matzikama	50,207	67,147	2.9
Cederberg	39,320	49,768	2.4
Bergrivier	46,330	61,897	2.9
Saldanha Bay	70,439	99,193	3.5
Swartland	72,118	113,762	4.7
West Coast	**278,414**	**391,767**	**3.3**

The district has grown at a rate of approximately 3.3% between 2001 – 2011. Swartland Municipality experienced the highest growth (4.7%) followed by Saldanha Bay (2.9%) and Matzikama and Bergrivier at 2.4% respectively. Population growth in the CWDM implies an increase in waste generation between 2001 and 2011.

4.8.2.2 Household income levels

Figure 72 depicts the various income levels in WCDM for 2014.



	Berg Rivier	Cederberg	Matzikama	Saldanha Bay	Swartland
Very Low & Low income (R0 - R38 200)	48%	58%	56%	48%	50%
Middle income (R38 201 - R76 400)	22%	21%	18%	17%	20%
High & Very High income (R76 401 or more)	29%	21%	26%	35%	30%

Figure 72: Household income levels, 2014 (Source: Provincial Treasury, 2014)

The majority of the households fall within the very low and low income group (R0 – R38 200). Saldanha Municipality has the highest number of households within the high and very high income group (35%) in the district.

4.8.2.3 Employment[51]

Figure 73 depicts the distribution of skills levels in the WCDM for 2013. The employment status of WCDM indicates that the majority of employed people fall within the semi- and unskilled formal employment category (40,570) and only 22,626 people fall within the highly skilled formal employment category. The disparity between demand and supply for labour skills is indicated in the MERO studies and the MERO (2014) specifically highlights the oversupply of the semi- and unskilled employment category as indicated in Figure 73.

[51] Highly skilled occupations include managers, professionals and technicians, semi-and unskilled labour include domestic workers and other elementary workers and skilled all other occupations, e.g. clerks, sales & services, skilled agricultural workers, crafts, machine operators, etc. (StatsSA Labour Force Survey, LFS and QLFS).

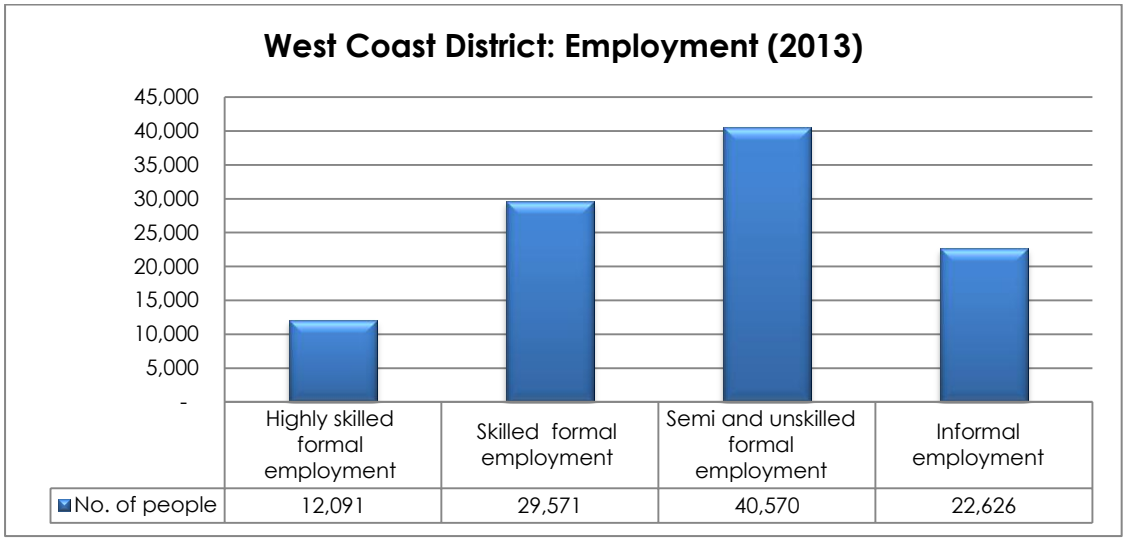
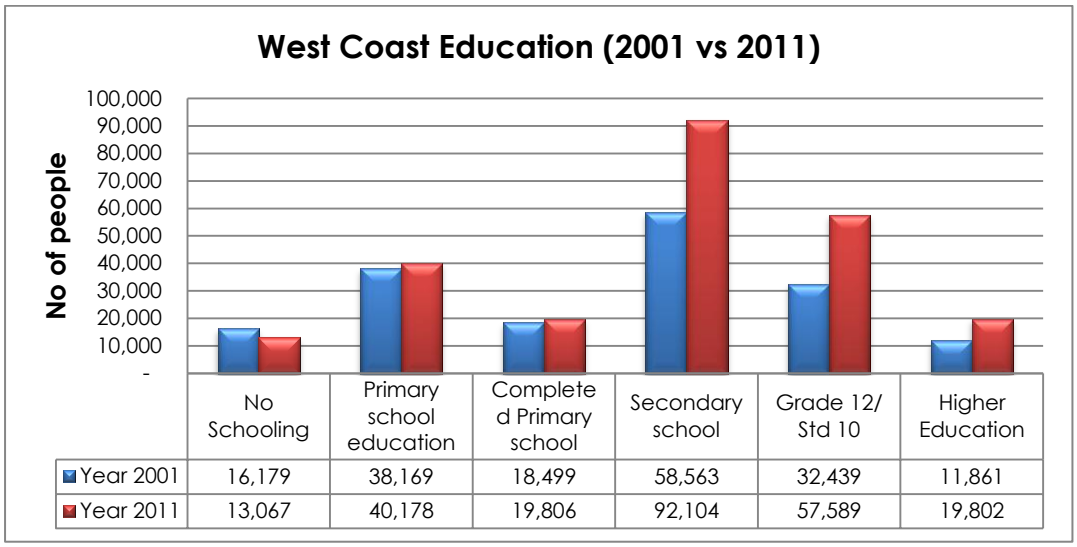


Figure 73: Employment 2013 (Source: MERO, 2014)

In the waste sector a similar picture is seen as there are more people employed in the semi- and unskilled employment category than in the highly skilled and skilled employment category. However the MERO (2014) indicates that this is changing as the demand for the semi- and unskilled employment category is declining whereas the demand for highly skilled and skilled labour is growing.

4.8.2.4 Level of education

The level of education is considered as an indicator of the potential for employability, although this will be influenced by employment opportunities available within the district based on growth and development potential in the area. The Regional Development Profile documents (WCG: Provincial Treasury, 2012) emphasise the importance of education in improving access to employment opportunities and in sustaining as well as accelerating economic growth. Figure 74 depicts the level of education in the WCDM for the years 2001 and 2011. Most people within the WCDM have received secondary schooling and passed Matric/Grade 12 with fewer people that have received higher education.



	No Schooling	Primary school education	Completed Primary school	Secondary school	Grade 12/ Std 10	Higher Education
Year 2001	16,179	38,169	18,499	58,563	32,439	11,861
Year 2011	13,067	40,178	19,806	92,104	57,589	19,802

Figure 74: Education (2001 vs 2011)

4.8.2.5 Economic status

Figure 75 provide the real economic growth rate (percentage real GDPR growth) for the main sectors for WCDM. The tertiary sector dominates in the district contributing to 64% of the GDPR. Dominant sectors are Business Services (20.1%), Agriculture, Forestry and Fishing at 14.3% and Wholesale and Retail and Trade (12.1%). This gives an indication of the types of waste being generated within the district.

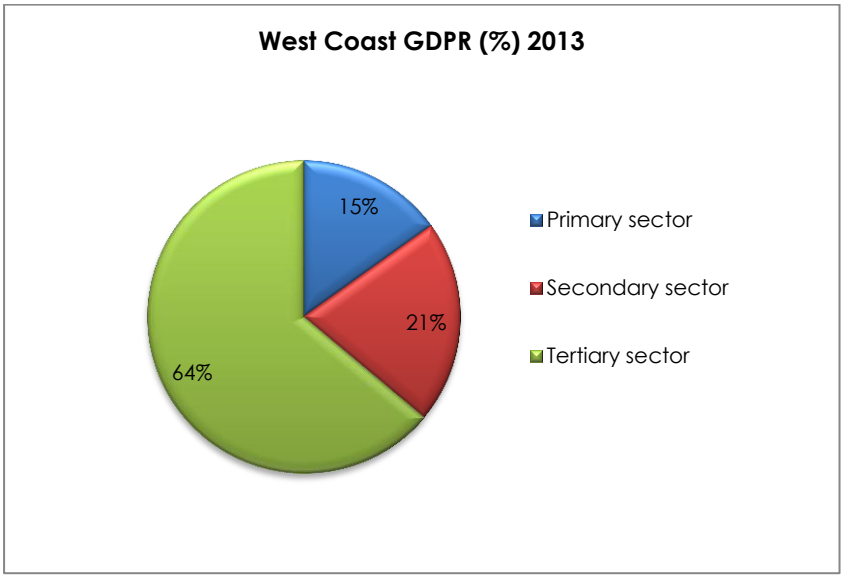


Figure 75: Sectors contributing to GDPR (MERO, 2014)

The detailed sector contributions to the West Coast GDPR are shown below.

Primary Sector	Agriculture, Forestry & Fishing (14.3%), Mining & Quarrying (0.7%), Water (0.1%)
Secondary Sector	Food, Beverages & Tobacco (8.0%), Textiles, Clothing & Leather Goods (0.4%), Wood, Paper, Publishing & Printing (0.7%), Petroleum Products, Chemicals, Rubber & Plastic (1.5%), Other Non-Metal Mineral Products (1.2%), Metals, Metal Products, Machinery & Equipment (3.0%), Electrical machinery & Apparatus(0.3%), Radio, TV, Instruments, Watches &Clocks (0.1%), Furniture & Other manufacturing (0.7%),Electricity (0.8%),Construction 4.3%)
Tertiary Sector	Transport Equipment (0.7%), Wholesale & Retail Trade (12.1%), Catering and accommodation Services (1.0%), Transport & Storage (5.1%), Communication (3.2%), Finance & Insurance (6.9%), Business Services (20.1%), Community, Social & Personal Services (3.8%), General Government (11.0%)

4.8.2.6 Transport Infrastructure

The road network in the district is mainly rural with major roads in the north-south N7 (Cape Town to Springbok) and R27 (Cape Town to Velddrift). There are also a number of regional roads (east-west) through the towns of Vredendal (R362), Clanwilliam (R364), Citrusdal (R365), Piketberg (R399), Moorreesburg (R311) and (R45) and Malmesbury (R315) (2nd generation IWMP 2011).

4.8.2.6.1 Berg Rivier

The major roads are the north-south N7 and R365, the east-west R399 (Velddrif to Piketberg) and the R44 (Piketberg to Porterville) which link most of the towns within the Bergrivier Municipal boundaries. Aurora and Redelinghuys are the only two towns that are only accessible via rural roads (3rd generation IWMP 2014). Bergrivier Municipality does not have a licenced WDF and all the household and business waste from the two Transfer Stations are transported beyond the municipal boundaries. Wasteman Holdings, a waste contractor, transports waste from the Velddrif Transfer Station in 30 m³ containers via the R27 West Coast road to the Vredenburg landfill site (a distance of about 72km). Wasteman Holdings also transports waste from the Piketberg Transfer Station via the N7 to the Highlands landfill site in Malmesbury (a distance of about 25km).

4.8.2.6.2 Cederberg

The road network is rural and the major roads are the north-south N7, the east-west R364 (Lamberts Bay to Doringbos, through Clanwilliam) and the R365 (Paleisheuwel to Lamberts Bay), which link most of the towns within the Cederberg Municipal boundaries, except Elands Bay and Wuppertal. A railway line also runs in a north-south direction through Graafwater(2nd generation IWMP 2013).

4.8.2.6.3 Matzikama

The road network is rural with the major roads in the north-south N7, east-west R362 (Klawer to Lutzville) and the R27 (Vanrhynsdorp to Vredendal), which effectively links most of the towns within the municipal boundaries (2nd generation IWMP 2010).

4.8.2.6.4 Saldanha Bay

The road network is rural and the major road is the north-south R27 (West Coast Road) which links the main towns within municipal area. The main railway line is the Orex rail line which connects Sishen and Saldanha (2nd generation IWMP 2011). All waste is transported to the Vredenburg WDF and the figure below shows the distances from the different towns to the WDF.

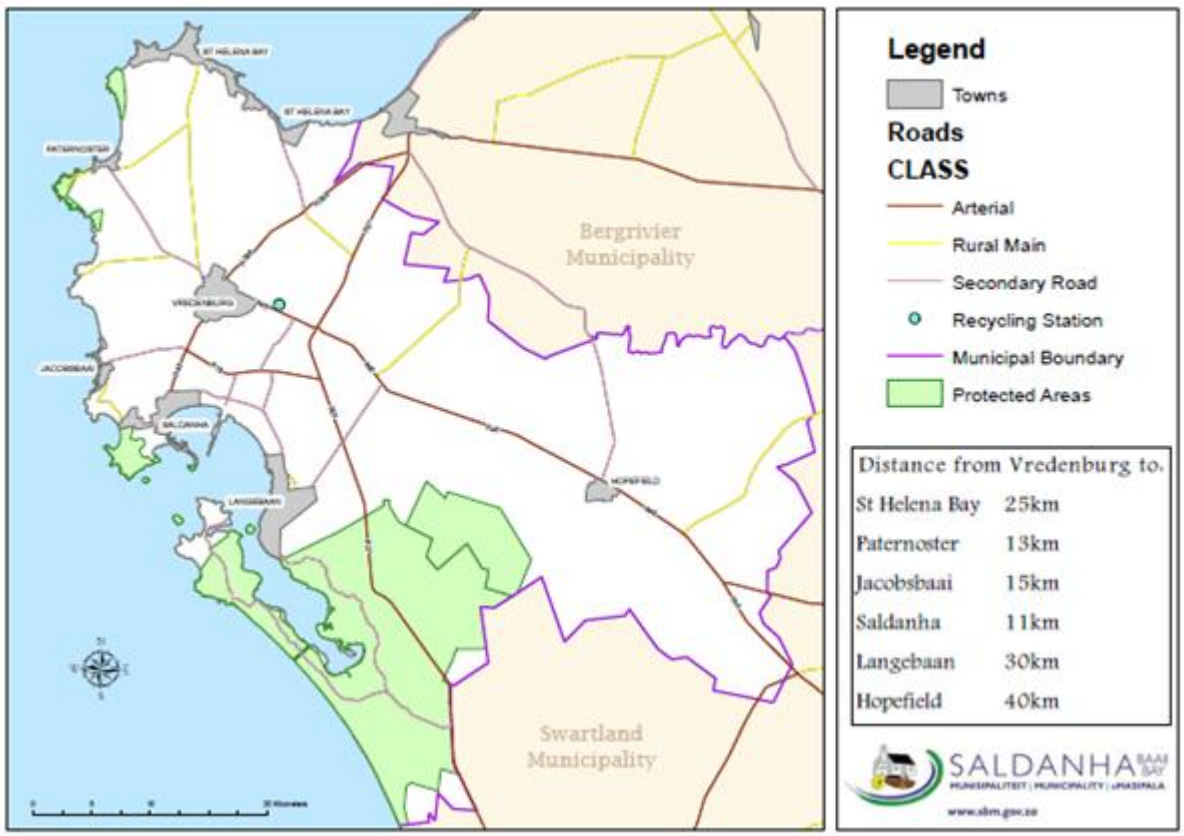


Figure 76: Distances from towns in Saldanha Bay Municipality to the Vredenburg WDF

4.8.2.6.5 Swartland

The road network is rural and the major roads are the north-south N7 and R27, the southeast-northwest R45 and the east-west R315 which links most of thetowns within the municipal boundaries. There are railway lines that connect most of the towns (2nd generation IWMP 2012).

4.8.2.7 Development profiles

Residential, commercial and industrial developments have an impact on the amount and types of waste generated as well as the different kinds of waste management services required within a municipal area. In order to facilitate integrated waste management planning, municipalities need to have a good understanding of the developmental and infrastructural needs within the municipal area. This together with the demographics of the municipal area is required for projecting current and future waste quantities. This section provides information on housing backlogs and delivery programmes for the West Coast District Municipality and has been sourced from the 2014/15 IDP Reviews for the district and local municipalities as well as housing demand and delivery information sourced from the Western Cape Government: Department of Human Settlements.

4.8.2.7.1 Housing type

The inhabitants of the WCDM reside in a variety of housing types or dwellings. Statistics South Africa (Census 2011) defines the three main dwelling types as follows –

- Formal dwellings include a house or brick/concrete structure on a separate stand or yard or on a farm, flat or apartment in a block of flats, cluster house in a complex, townhouse (semi-detached house in a complex), semi-detached house, house/ flat/ room in a backyard and a room/ flatlet on a property or a larger dwelling/ servants' quarters/ granny flat;
- Informal dwellings include a backyard shack, a shack not in a backyard but in an informal/ squatter settlement (informal residential) or on a farm; and
- Traditional dwellings include huts and structures made of traditional materials such clay, mud, reeds or other locally available natural materials e.g. homesteads/ rondavels.

Figure 77 depicts the dwelling type and indicates the quality of housing in relation to human settlements. It reveals that the majority of households in the West Coast District Municipality are in formal dwellings (89%) and 11% in informal and traditional dwellings.

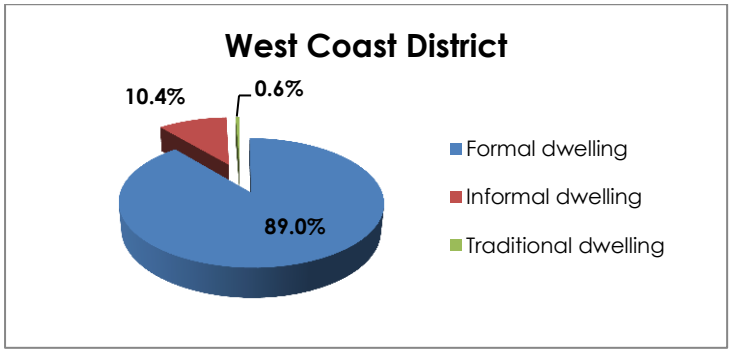


Figure 77: Access to housing

4.8.2.7.2 Housing demand and delivery

The Western Cape Department of Human Settlements (Raynita Robertson perscomm, 2015) highlights that Housing Demand databases within municipalities often include registered persons who may be residing within one District but have opted to register for a house in a different District. Figure 78 depicts the number of registered persons (38862) on the West Coast Housing Demand database. The Swartland Municipality has the highest number of persons (14 342) registered on the Housing Demand database with the lowest number of registered persons (4 351) in the Berg River Municipality (Figure 78).

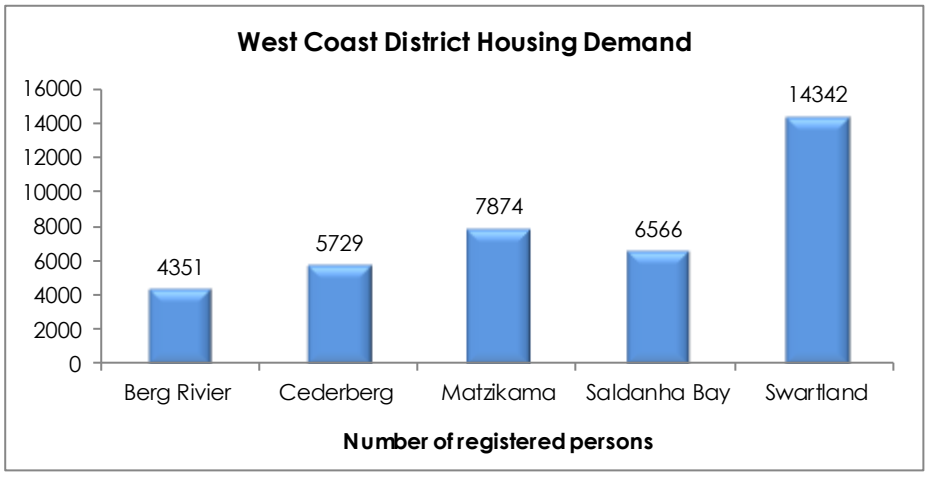


Figure 78: Housing Demand (as at July 2015)

Figure 79 depicts the estimated housing that can be delivered between 2009 and 2015 based on available Division of Revenue Act (DORA) allocation, the potential housing that can be delivered between 2016 and 2021 is not available for this District.

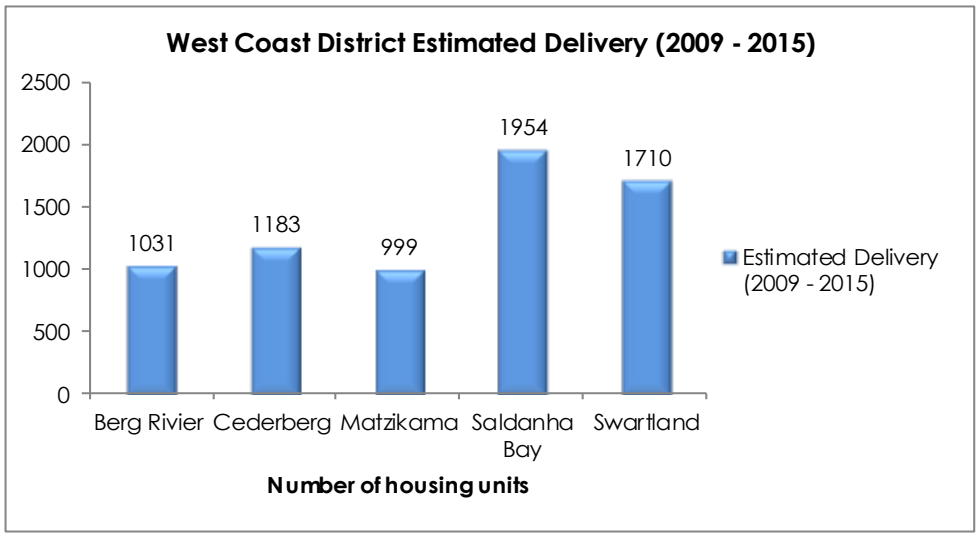


Figure 79: Estimated Housing Unit Delivery

The current housing backlog and IDP housing projects are shown in Table 54.

Table 54: Housing Backlog and IDP Projects (IDP Review, 2014/15)

Municipality	Housing Backlog	Housing projects	Budgeted/ Estimated Cost
Berg Rivier	4 285 applications	No clear indication	R21 769 000
Cederberg	4 916 units	No clear indication	R7 000 000
		492 units	No clear indication (2015 – 2017)
Matzikama	7 786 units	7 786 units	R800 000 000
		800 sites & 180 units	No clear indication (2015 – 2017)
Saldanha Bay	8 179 units	1 000 units	No clear indication (2014 – 2017)
Swartland	2 242 sites 2 884 units	100 sites 288 units	R40 540 000

The municipal IDP Reviews (2014/15) highlights the following challenges regarding housing backlogs –

- Berg Rivier Municipality has limited development plans for housing due to inadequate water resources and bulk infrastructure within the municipal area, and
- Due to limited funding, Matzikama Municipality is implementing the provincial housing department policy that requires for any available funding for housing to be used to provide basic municipal services to backyard dwellers. The Municipality also informs the homeless on the housing waiting list to construct and live in shacks until funding becomes available to deal with the housing backlog.

4.8.2.8 Housing delivery and Service levels

This section focuses on how the current and future housing status will affect the provision of the waste collection service. The WCDM service levels data used in this section, basic services (99.9%) and free basic services (83%), was obtained from the Department of Local Government and provides the status of service levels as at June 2015. The data, however, does not provide specifics with respect to service provision to informal dwellings, particularly informal settlements. All the municipalities within the WCDM need to investigate potential delivery estimates for the 2016 to 2021 years as done by the other districts.

4.8.2.10.1 Berg River Municipality

The service levels for Berg River are at 100% for basic services and at 117% (percentage does not only include free services to the indigent but also to the formal and informal households that cannot afford to pay for the service) for free basic services as at June 2015. The Municipality has 4 351 people registered on the housing demand database (as at July 2015), the lowest backlog in the WCDM. The estimated housing delivery between 2009 and 2015 was 1 031. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.8.2.10.2 Cederberg Municipality

The service levels for Cederberg are at 99% for basic services and at 101% (percentage does not only include free services to the indigent but also to the formal and informal households that cannot afford to pay for the service) for free basic services as at June 2015. The Municipality has 5 729 people registered on the housing demand database (as at July 2015) and the estimated housing delivery between 2009 and 2015 was 1 183. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a basic service to the 1% of households without a service currently,
- improving the waste collection servicest, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

4.8.2.10.3 Matzikama Municipality

The service levels for Matzikama are at 100% for basic services and at 108% (percentage does not only include free services to the indigent but also to the formal and informal households that cannot afford to pay for the service) for free basic services as at June 2015. The Municipality has second highest number (7 874) of people registered on the housing demand database (as at July 2015) and the estimated housing delivery between 2009 and 2015 was 999, the lowest in the district. Based on this data, it can be assumed that the municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.8.2.10.4 Saldanha Bay Municipality

The service levels for Saldanha Bay are at 100% for basic services and at 78% for free basic services as at June 2015. The Municipality has 6 566 people registered on the housing demand database (as at July 2015) and the estimated housing delivery between 2009 and 2015 was 1 954. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a free basic service to the 22% of households without a service currently,
- improving the waste collection servicest, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

4.8.2.10.5 Swartland Municipality

The service levels for Swartland are at 100% for basic services and at 67% for free basic services as at June 2015. The Municipality has the highest number (14 342) of people registered on the housing demand database (as at July 2015) and the estimated housing delivery between 2009 and 2015 was 1 710. Based on this data, it can be assumed that the municipality's plans may focus on -

- providing a free basic service to the 33% of households without a service currently,
- improving the waste collection servicest, and
- providing a basic service to houses that will be delivered as per the municipality's housing plans.

4.8.3 Waste generation areas

4.8.3.1 Waste quantities

Waste generation rates vary between munipalities and the following rates, as reflected in the local municipal IWMPs were used:

- Matzikama Local Municipality – 0.66kg/c/day
- Cederberg Local Municipality – 0.63kg/c/day
- Bergrivier Local Municipality – 0.61kg/c/day
- Saldanha Bay Local Municipality – 1.40kg/c/day
- Swartland Local Municipality – 1.20kg/c/day

Based on the above rates it is estimated that waste generation figures in the WCDM, using the 2015 population figures as the baseline, will increase by 7.2% by 2020, 19.2% by 2030 and 29.0% by 2040. The projected general waste generation figures include domestic, commercial and industrial general waste in most of the municipalities. In some of the municipalities building rubble and public cleansing waste are also included.

The projected waste generation growth in the WCDM can be attributed to large scale residential development and the development of the Saldanha Bay Industrial Development Zone (IDZ). The IDZ will also produce more hazardous waste as a result of the predominantly oil, gas and heavy industries that will be established in the region.

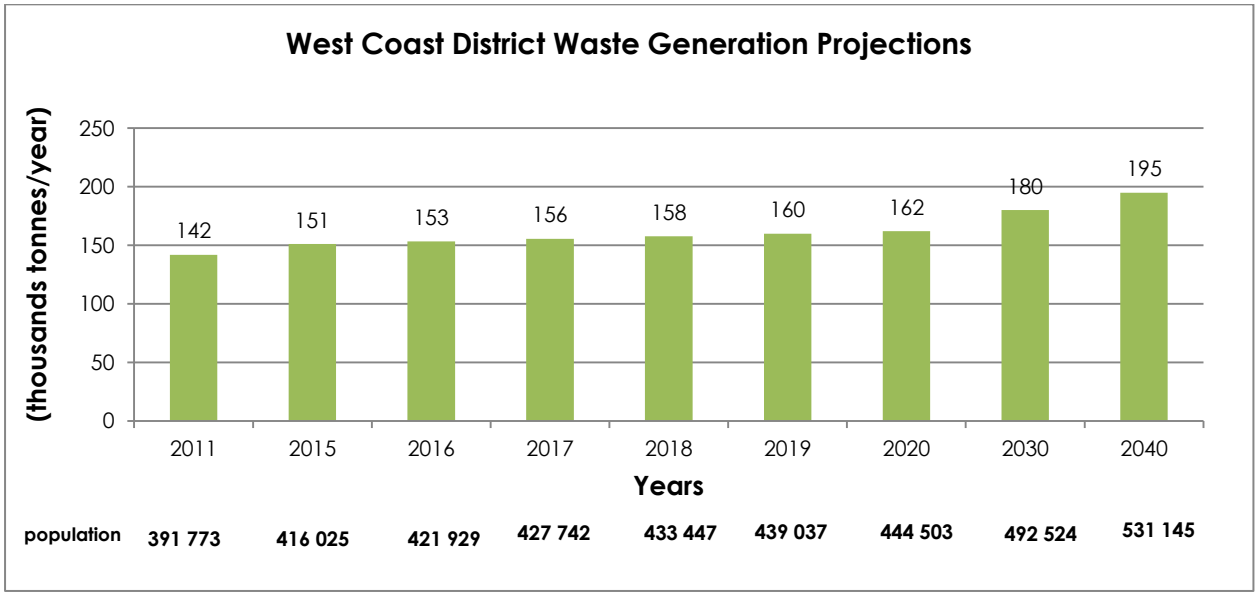


Figure 80: Waste generation quantities 2011 - 2040

4.8.3.2 Waste composition

4.8.3.2.1 General waste

The largest component of the waste characterisation study conducted in 2007 was organic waste, paper and cardboard. The other big contributors towards the overall waste composition were plastics and glass. A waste characterisation study conducted in Cederberg during 2014 had organic waste (food and greens) at 49% and paper and cardboard at12%. Also in 2014 a waste characterisation study conducted in Matzikama had food and greens at 40% and paper and cardboard at 19%.

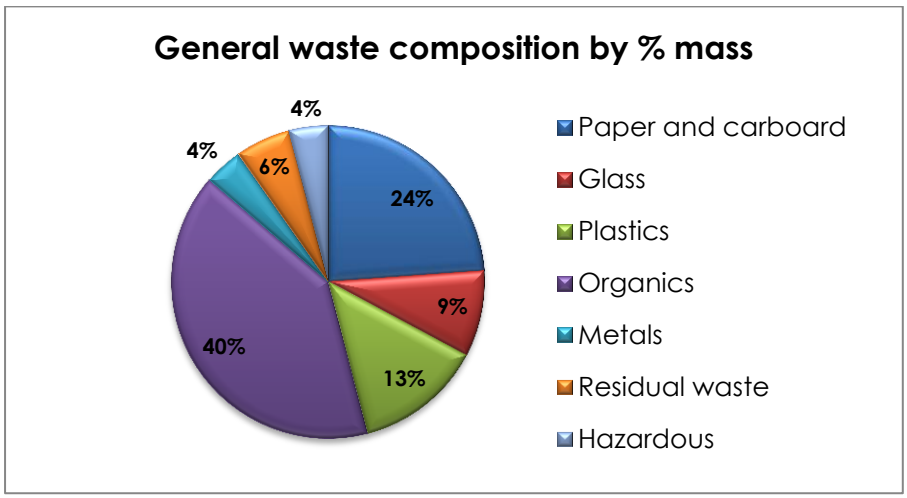


Figure 81: General waste composition by % mass

4.8.3.3 Health care risk waste

The Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007) defines Health Care Risk Waste (HCRW) as that portion of health care waste that is hazardous and includes infectious waste, pathological waste, sharp waste, pharmaceutical waste, genotoxic waste, chemical waste, waste with heavy metals, radioactive waste, and any other health care waste which is defined as hazardous in terms of the Waste Management Series: Document 1: Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, as published by the Department of Water Affairs and Forestry.

HCRW is either incinerated as a means of disposal or treated through Electro Thermal Destruction. Incineration of HCRW is one of the most effective means to eliminate the risks posed by health care risk waste and also reduces the overall volume of the waste. HCRW is mainly removed to be treated and disposed by service providers who have to be registered on the Western Cape Integrated Pollutant and Waste Information System (IPWIS) as required in terms of the National Environmental Management: Waste Act: National Waste Information Regulations, January 2013. The HCRW Generators are also required to register and report to the provincial

IPWIS, which then exports the data onto the national waste information system (SAWIS).

According to the IPWIS (October 2015), 88 governmental, non-governmental and private healthcare facilities within WCDM have registered and 38 are reporting on the provincial system to date.

Table 55 depicts the number and types of healthcare facilities available across WCDM.

Table 55: Healthcare facilities

Community health centres	Community day centres	Number of PHC clinics - fixed	Number of PHC clinics - non-fixed (satellites)	Number of PHC clinics - non-fixed (mobiles)	Number of district hospitals	Number of regional hospitals	Total
0	1	26	22	18	7	0	74

Source: WCG Provincial Treasury - Socio-economic Profile 2014 Working Paper

The amount of HCRW reported on the IPWIS for the period January 2014 to August 2015 amounted to 3,481.04 tonnes. Figure 82 provides the percentage contribution of HCRW across WCDM.

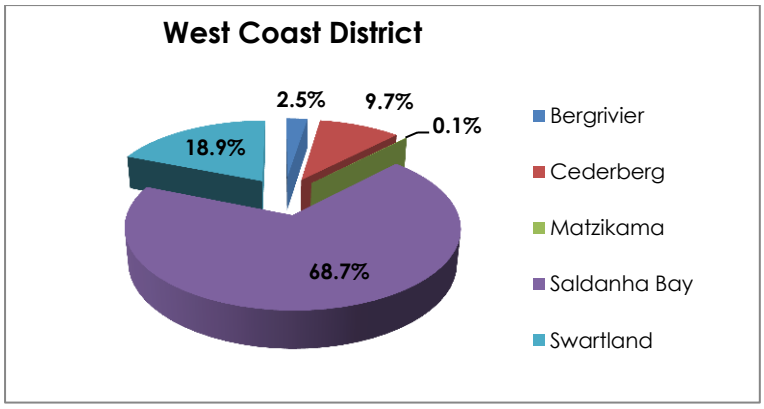


Figure 82: Healthcare risk waste percentage distribution

4.8.3.4 Hazardous Waste

No information provided in local IWMPs.

4.8.3.5 Problem waste streams

4.8.3.5.1 Agricultural waste

The West Coast District crop type is predominantly dryland cereals, with the smaller sectors being grapes, teas, vegetable oils, vegetables and citrus[52].

There is a lack of information on the liquid and solid waste generated from these production processes.

[52] Western Cape Government: Water Infrastructure & opportunities for agriculture & agri-processing in the Western Cape (2015)

4.8.3.5.2 Sewage sludge

Table 56 depicts sewage sludge management in the WCDM.

Table 56: Wastewater Treatment Works and sewage sludge disposal

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Matzikama	Ebennaeser	Sludge quantities unknown	Sludge is buried after drying.
	Klawer	Sludge quantities unknown	Sludge is buried after drying.
	Koekenaap	Sludge quantities unknown	Sludge is buried after drying.
	Lutzville	Sludge quantities unknown	Sludge is buried after drying.
	Lutzville Wes	Sludge quantities unknown	Sludge is buried after drying.
	Strandfontein	Sludge quantities unknown	Sludge is buried after drying.
	Van Rhynsdorp	Sludge quantities unknown	Sludge is buried after drying.
	Vredendal North	Sludge quantities unknown	Sludge is buried after drying.
	Vredendal South	Sludge quantities unknown	Sludge is buried after drying.
	Doringbaai	Sludge quantities unknown	Sludge is buried after drying.
Swartland	Malmesbury	7 700m³ per annum	Secondary sludge is digested and mechanically dewatered. Dried sludge is removed to a farm.
	Darling		Secondary sludge is digested and mechanically dewatered. Dried sludge is disposed of on-site.
	Moorreesburg		Secondary sludge is dried on sand beds and then disposed of on-site.
	Riebeeck Kasteel		Secondary sludge is digested and mechanically dewatered. Dried sludge is disposed of.
	Koringberg	Not applicable (ponds)	Not applicable (ponds)
	Chatsworth	Not applicable (ponds)	Not applicable (ponds)
	Kalbaskraal	Not applicable (ponds)	Not applicable (ponds)

Municipality	Wastewater Treatment Works	Sludge quantities	Disposal methods
Cederberg	Citrusdal	No information received	No information received
	Clanwilliam	No information received	No information received
	Eland's Bay (Piketberg)	No information received	No information received
	Graafwater	No information received	No information received
	Lambert's Bay	No information received	No information received
	Wupperthal	No information received	No information received
Bergrivier	Piketberg	Sludge quantities unknown	Sludge is directed into two dams behind the sewage works.
	Porterville	Sludge quantities unknown	Sludge is directed to sludge dams within the plant.
	Velddrif	Sludge quantities unknown	Sludge is disposed of on site.
	Dwarskersbos	Sludge quantities unknown	Sludge is disposed of on site.
	Eedenkuil	Sludge quantities unknown	Sludge is disposed of on site.
Saldanha Bay	Hopefield	3335 kg/month	Sludge is stored on site.
	Langebaan	19 824 kg/month	Sludge is stored on site and used by the Parks Department.
	Saldanha	31182 kg/month	Sludge is stockpiled on site.
	Vredenburg	11520 kg/month	Currently sludge is stored on site. Local businesses use the sludge for making compost. There is a composting plant on site that must be re-commissioned.
	Paternoster	5615 kg/month	Stockpiled on-site and applied to grass at the site.
	Shelly Point	1308 kg/month	Stored on site, used by Parks Department.
	Laingville (St Helena Bay)	14 875 kg/month	Stored on site, used by Parks Department.

4.4.9.1.2 Abattoir waste

The following information was obtained regarding management of abattoir waste in WCDM.

Table 57: Abattoir waste

Municipality	Number of abattoirs	Disposal methods	Disposal quantities
Swartland	10	Disposal at Highlands WDF	620.39 tonnes (May - Nov 2014) 751.92 tonnes (Jan, Feb, June - Sept 2015)
Matzikama		Unknown	Unknown
Cederberg	1	Unknown	Unknown
Bergrivier	1	Unknown	Unknown
Saldanha Bay	1	The abattoir does not make use of the municipal WDF. Liquid waste to WWTW, solid waste are buried	±9 tonnes/day (manure, blood & expired meat) ± 1 tonnes/day (manure, water & blood to Saldanha WWTW)

4.4.9.1.3 Tyres

Handling of tyre waste and quantities are unknown due to limited reporting from industries.

4.8.4 Waste avoidance, reduction and recycling[53]

The WCDM does not provide support to the local municipalities with regards to waste minimisation and recycling initiatives.

4.8.4.1 Cederberg Municipality

Waste awareness

The municipality has initiated and implemented the following projects with regards to waste management:

- Road shows by Youth Jobs in Waste in the form of door-to-door and school awareness campaigns; and
- Waste awareness signs are present on some bins in the town centres.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- The municipality provides support to a number of privately owned businesses that recover waste e.g. provides green waste to Patrysvlei for chipping and composting as well as mentorship and training to Boeta Joe's Scrap.

Job creation

- The municipality has EPWP workers and Youth in Waste workers employed to clean towns, do rehabilitation and cleaning of illegal dumping and around landfill sites.

4.8.4.2 Matzikama Municipality

Waste awareness

- Awareness campaigns are conducted with the Youth Jobs in Waste Programme by explaining the benefits of recycling to the community.

Waste minimisation

- A waste separation system has been implemented in the municipality through the Youth Jobs in Waste Programme project.
- Recovery of recyclables takes place in the lower income residential areas.
- Material recovery is supported by the Municipality.

Job creation

- Youth Jobs in Waste Programme workers were appointed by the Municipality.

[53] Greenest Municipality Competition: Waste Management Report 2015/2016

4.8.4.3 Swartland Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- The municipality has produced 20 000 pamphlets on the topic "What is the impact of refuse on your environment?" which was handed out to community members.
- 19 Advertising boards and 23 new notice boards were placed throughout Swartland Municipality to promote recycling.
- Awareness prints on all public refuse bins to promote, reduce, re-use and recycle.
- The above recycling initiative and other town cleaning news are also promoted to the community via quarterly newsletters.
- "Keep our town clean" car license disc stickers are distributed at schools and petrol stations by the Traffic Department.
- The Greenest Municipality Competition is promoted on the municipal letterhead.
- Door-to-door campaigns are conducted in communities where illegal dumping is observed.
- The municipality, together with the Youth Jobs in Waste Programme, has initiated road shows focussing on promoting recycling and a cleaner environment in all 11 towns within the Municipality.
- The Youth Jobs in Waste Programme also includes raising awareness at schools.
- Waste awareness signage in the city centre and lower income residential areas were encountered during site visits.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- The municipality supports two swop shops, in Darling and Paardeberg, by transporting recyclables to the Highlands MRF and WDF. The materials are bought from the swop shops by the contractor who operates the MRF.
- The municipality has 77 recycling igloos of which 26 are placed at schools and other strategic locations within the municipality for the collection of recyclables.
- The municipality supports material recovery which takes place at the Highlands MRF. This service is managed by a contractor.
- Garden refuse is separated from the rest of the waste in the town of Moorreesburg.

Job creation

- EPWP funding is utilised to employ 97 workers for area cleaning within the municipality.
- The municipality employs 10 workers as watchmen at the skips and to clean the open spaces within the municipality.

4.8.4.4 Saldanha Bay Municipality

Waste awareness

- Youth Jobs in Waste workers conduct door-to-door awareness campaigns within the municipality.
- A quarterly recycling advertisement is placed in a local newspaper namely the "Weslander".

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- Recycling igloos are strategically placed throughout the Municipality.
- The municipality supports material recovery. However, the Municipality did not have a contract in place during the time of the evaluation. They were however in the process of implementing a new contract.
- The municipality also supports the initiative of the Langebaan Country Estate to separate waste at source by transporting the recycling material to the MRF or the local recycler.
- The chipping of green waste takes place within the Municipality.

Job creation

- EPWP waste teams are appointed by the Municipality to assist with area cleaning.

4.8.4.5 Bergriver Municipality

Waste awareness

The following waste awareness initiatives are implemented:

- Waste awareness signage is present on bins.
- Waste awareness signage is present at waste disposal and drop-off facilities;
- Waste related articles are published in municipal newsletters and local newspapers; and
- The public is also informed about waste management through Public Awareness programmes and public meetings.

Waste minimisation

The following waste minimisation initiatives are implemented in this Municipality:

- A three-bag system is used in all residential areas. A black bag is used for waste that cannot be recycled, a clear bag for recyclable waste and a green bag for garden refuse. The Municipality has appointed a contractor to manage the recyclables.
- Drop-off facilities are available in Porterville and Aurora and recycling are strategically placed within the towns of Porterville and Velddrift.
- Recycling bins are also placed at the holiday resort during festive seasons.
- The municipality supports material recovery which takes place in Piketberg and Velddrift. This service is provided by a contractor.

- Garden waste is chipped by the municipality and the final product is used as cover material on the old landfill sites and also as ground cover in municipal and private gardens.

Job creation

- EPWP projects were implemented for waste separation and for cleaning streets and public open spaces. An amount of R470 000 in was utilised for this initiative.

4.8.4.6 Waste information

4.8.4.6.1 Bergrivier Municipality

Waste information is reported to the Department.

4.8.4.6.2 Cederberg Municipality

Cederberg Municipality does not report waste types and quantities to IPWIS.

4.8.4.6.3 Matzikama Municipality

Information on waste reporting to the Department is at 19%.

4.8.4.6.4 Swartland Municipality

Waste information is reported to the Department.

4.8.5 Treatment and disposal

Figure 83 depicts compliance scores at WMFs that were audited in the 2015/16 financial year. Key challenges experienced at the WMFs are lack of cover material, windblown litter, fencing, storm water management, limited machinery and component security and operational staff. Burning of waste takes place at most facilities. Facilities which yielded red ratings (0 -64%) and amber ratings (65 – 84%) will receive priority for the 2016/17 financial year.

Compliance scores ratings:

Total	Status Indicator		Action
85 – 100 %	Green	X	Small changes needed
65 – 84 %	Amber		Improvements required
0 – 64 %	Red		Major improvements required

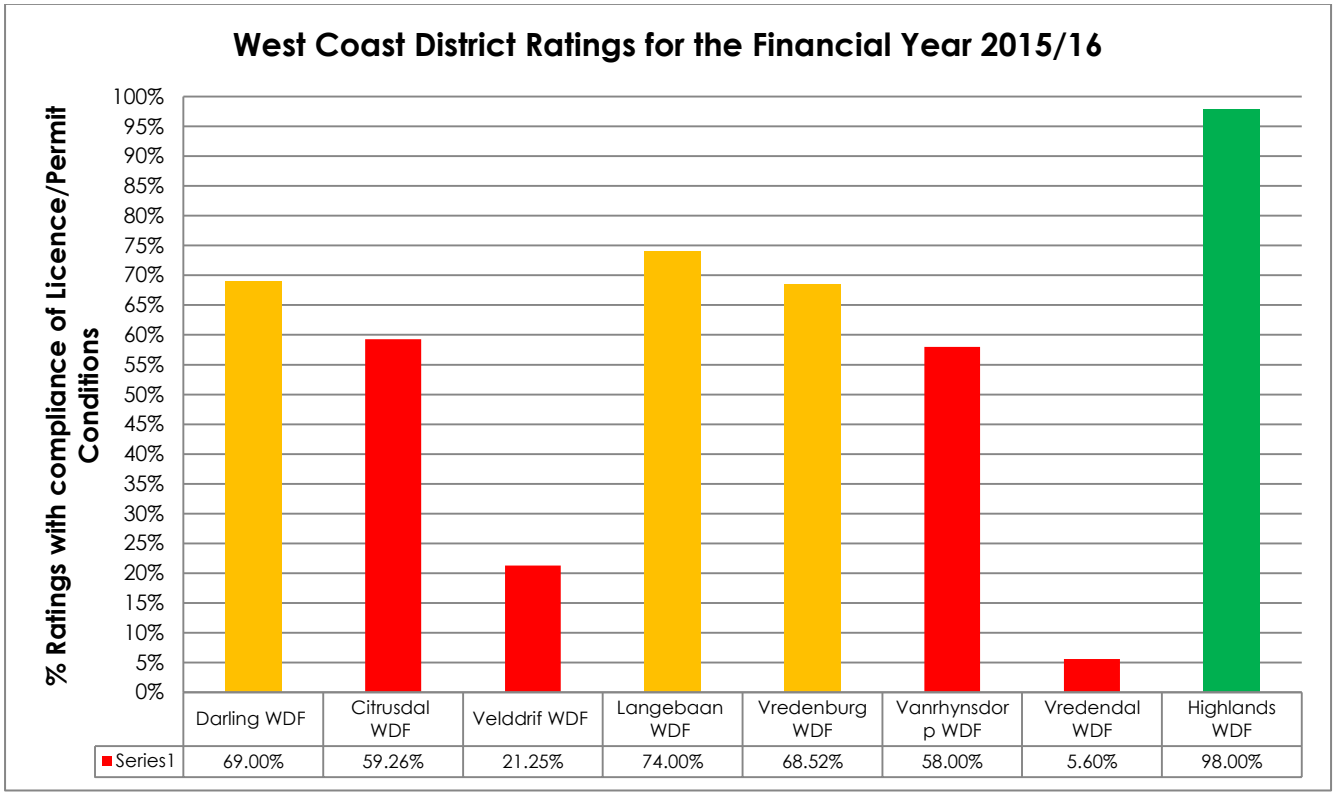


Figure 83: Compliance Audit Outcomes at WDFs (2015/16)

The status quo of waste management facilities in WCDM is provided in Table 58.

It should be noted that the facilities in Table 58 with decommission licence type statuses isssued in 2014/15 fiscal year are issued with licence conditions to commence with decommissioning within a 5 year period. This condition was implemented to allow the municipalities to plan and prepare alternatives for the closure of the waste disposal facilities..

Table 58: Conditions of Waste Management Facilities

Municipalities	Waste Management Facility	Classification	Licence Type	Available Airspace incl. years
Bergrivier	Cape Agulhas WDF	G:C:B-	Closure	n/a
	Piketberg RTS			n/a
	Porteville Drop Off			n/a
	Aurora Drop off			n/a
	Veldrift RTS			n/a
	Redelinghuys WDF	G:C:B-	Decommission (2014/15)	Unknown
	Piketberg WDF	G:C:B-	Closure	Unknown
	Porteville WDF	G:C:B-	Decommission (2014/15)	Unknown
	Aurora WDF	G:C:B-	Closure	Unknown
	Veldrift WDF	G:C:B-	Closure	Unknown
Matzikama	Klawer WDF	G:C:B-	Decommission (2014/15)	Unknown
	Luztville WDF	G:C:B-	Closure	Unknown
	Bitterfontein WDF	G:C:B-	Decommission (2014/15)	Unknown
	Van Rhynsdorp WDF	G:S:B-	Operation	Unknown
	Kliprand/Bitterfontein WDF	G:C:B-	Decommission (2014/15)	n/a
	Rietpoort WDF	G:C:B-	Decommission (2014/15)	
	Vredendal WDF	G:C:B+	Decommission (2014/15)	Unknown
	Doring Baai WDF		Decommission (2014/15)	Unknown
	Strandfontein WDF		Decommission (2014/15)	Unknown
	Klawer Drop Off			n/a
Saldanha Bay	Vredenburg WDF	G:M:B-		Estimated space available until 2017
	Langebaan WDF	G:S:B-		Estimated space available until 2059
	Saldanha Steel	G:L:B+	Unknown	n/a

Municipalities	Waste Management Facility	Classification	Licence Type	Available Airspace incl. years
Cederberg	Citrusdal WDF	G:S:B+	Operation	Insufficient capacity
	Clanwilliam WDF	G:C:B-	Decommission (2014/15	Insufficient capacity
	Lamberts Bay WDF	G:C:B-	Operation	Insufficient capacity
	Graafwater WDF	G:C:B-	Decommission (2014/15	Insufficient capacity
	Wupperthal WDF	G:C:B-	Operation	Unknown
	Elandsbaai WDF	G:C:B-	Operational	Unknown
	Algeria WDF	G:C:B-	Decommission (2014/15)	n/a
	Eselsbank WDF	G:C:B-	Operational	Unknown
	Liepoldtville WDF	G:C:B-	Decommission (2014/15)	n/a
	Clanwilliam WDF	G:C:B-	Decommission (2014/15)	n/a
Swartland	Highlands WDF	G:S:B-	Operation	Unknown
	Malmesbury WDF	G:C:B-	Operation	Unknown
	Darling WDF	Class 2	Operation	Unknown
	De Hoek WDF	G:S:B-	Operation	Unknown
	Riebeek kasteel WDF	G:C:B-	Operation	Unknown
	Riebeek West WDF	G:C:B-	Operation	Unknown
	Saldanha WDF	G:C:B-	Decommission (2014/15)	n/a
	Vredenburg WDF	G:M:B-	Operation	Unknown
	Hopefield WDF	G:S:B-	Operation	Unknown

4.8.5.1 Regionalisation of waste management

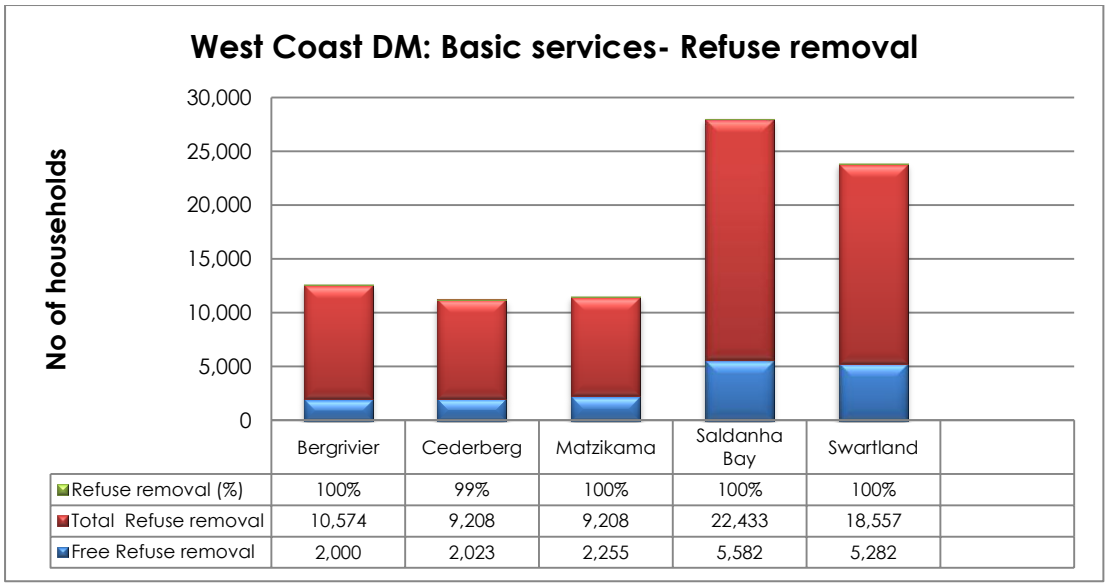
A regional waste management facility has been identified in Van Rhynsdorp. The facility will serve the municipalities of Matzikama and Cederberg. The planning of the facility is currently on hold as the municipalities are struggling with funding mechanisms.

4.8.6 Current and upcoming alternative waste treatment options

There are currently no upcoming alternative waste treatment options planned in the district.

4.8.7 Waste collection services

Figure 84 depicts that the level of domestic waste collection services in WCDM as at June 2015. It is noted that the level of services at most of the municipalities are at 100% except for Cederberg (99%).



	Bergrivier	Cederberg	Matzikama	Saldanha Bay	Swartland	
Refuse removal (%)	100%	99%	100%	100%	100%	
Total Refuse removal	10,574	9,208	9,208	22,433	18,557	
Free Refuse removal	2,000	2,023	2,255	5,582	5,282	

Figure 84: Refuse removal services as at June 2015 (Source: Provincial Treasury, 2015)

4.8.7.1 Illegal dumping

All local municipalities within WCDM provides public cleansing which involves areas of illegal dumping. It is noted that for the 2013/14 financial year, the cost of illegal dumping in Bergrivier Local Municipality was R2 000 000. Cleaning up of illegal dumping give rise to increased costs associated with clean-up efforts.

4.8.8 Cost of existing waste management system

Numerous attempts were made to obtain financial information around solid waste management from most local municipalities, however, this has been unsuccessful, with the exception of a few. Consequently, DEADP obtained financial OPEX and CAPEX (audited) for all local municipalities from Provincial Treasury. It should be noted that these are financial summaries of waste management services.

Table 59: CAPEX for WCDM (2011/12 – 2014/15)

CAPEX	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Bergriver	1 902	1 174	4	581
Cederberg	Unknown	Unknown	Unknown	Unknown
Matzikama	Unknown	Unknown	Unknown	8 329
Saldanha Bay	8 011	14 170	8 897	44 776
Swartland	4 749	34 360	4 903	2 024
Total	14 661	49 704	13 803	55 710

Source: Provincial Treasury

Table 60: OPEX Revenue for WCDM (2011/12 – 2014/15)

OPEX- Revenue	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Bergriver	11 328	12 069	14 092	20 291
Cederberg	3 341	3 232	9 750	11 568
Matzikama	10 457	11 662	12 906	15 771
Saldanha Bay	31 770	33 859	36 295	53 445
Swartland	21 512	25 682	27 270	28 591
Total	78 409	86 504	100 313	129 667

Source: Provincial Treasury

Table 61: OPEX Expenditure for WCDM (2011/12 – 2014/15)

OPEX-Expenditure	2011/12	2012/13	2013/14	2014/15
R(thousands)	Audited Outcome	Audited Outcome	Audited Outcome	Pre-audit Outcome
Bergriver	14 118	12 104	14 110	16 348
Cederberg	Unknown	Unknown	1 450	8 273
Matzikama	10 891	12 132	10 854	13 294
Saldanha Bay	33 460	48 492	45 071	52 887
Swartland	19 084	21 810	22 667	27 028
Total	77 554	94 538	94 152	117 829

Source: Provincial Treasury

Figure 85 shows the OPEX Revenue vs OPEX Expenditure for waste management services in the various local municipalities. Of concern are the deficits in Saldanha Bay and Matzikama municipalities. Bergrivier and Cederberg municipalities shows profits.

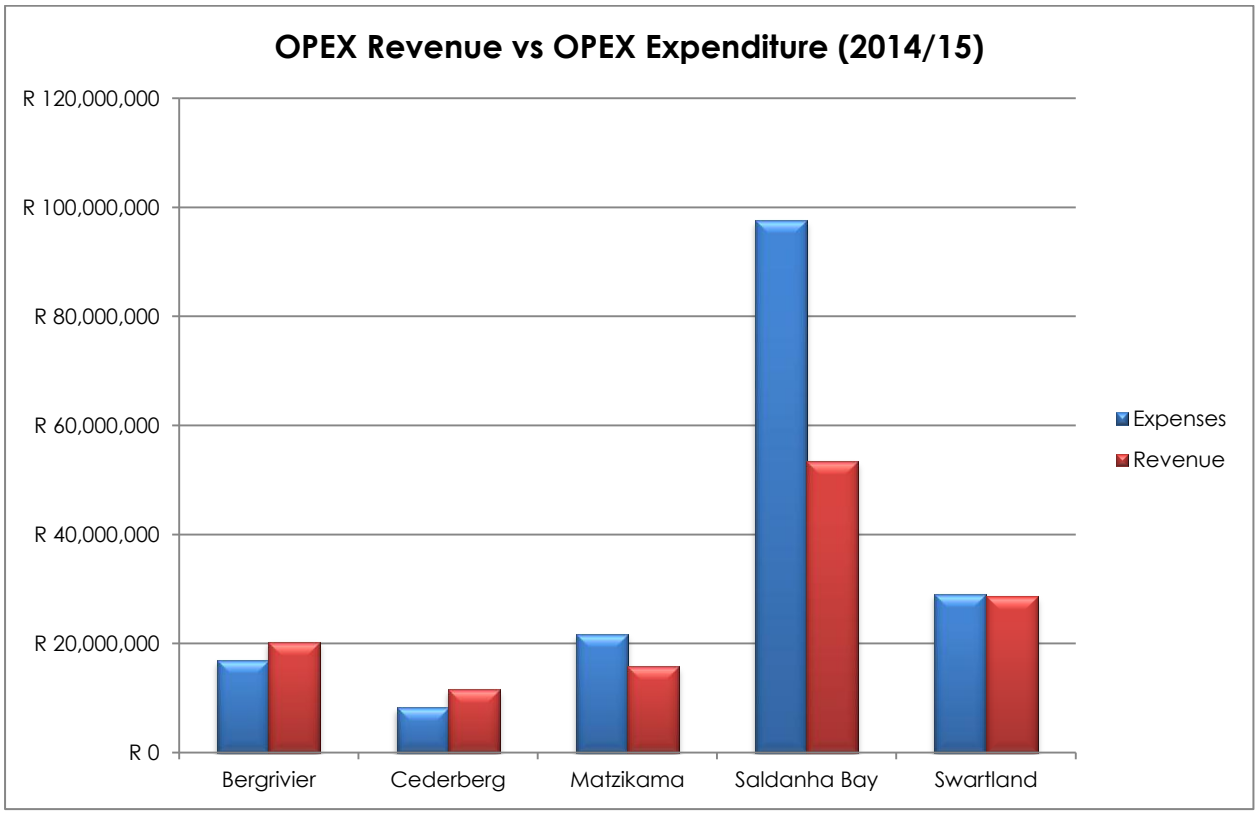


Figure 85: OPEX Revenue vs OPEX Expenditure: 2014/15 (Source: Provincial Treasury, 2014/15)

4.8.9 Governance

The WCDM has a dedicated staff component for waste management. The district does not have a Waste Officer's Forum.

The organisational structure for the various municipalities is depicted in Table 62.

Table 62: Organisational structure

	Matzikama	Cederberg	Bergrivier	Saldanha Bay	Swartland
Dept for waste management	Unknown	unknown	Civil Services	Engineering and Planning	Civil Department
Designated WMO	Yes	No	Yes	Yes	Yes
Vacancies	Unknown	Unknown	Staff needed for recycling	Unknown	Unknown
Staff training & development	Unknown	Unknown	On site training	Training provided annually	Unknown
Waste policy and by-laws - Aligned with the Waste Act & NWMS	Municipality does not have a Waste By-law	The Waste By-law is outdated (2005), therefore not aligned with the Waste Act	By-law is not aligned to Waste Act.	By-law is not aligned to Waste Act	Waste By-Law is align to Waste Act
Private sector involvement (collection, disposal, waste minimisation)	Unknown	Unknown	Collection and separation	Minimal involvement	Burton Niemand (waste collection) Wastegro (MRF Manager) Highlands Tshayela (street cleansing)
CBOs and NGOs interested	Unknown	Unknown	None	Biosphere involved in school recycling project	Waste Gro & DRESS

Source: Local Municipalities, 2015

4.9 CITY OF CAPE TOWN METROPOLITAN MUNICIPALITY

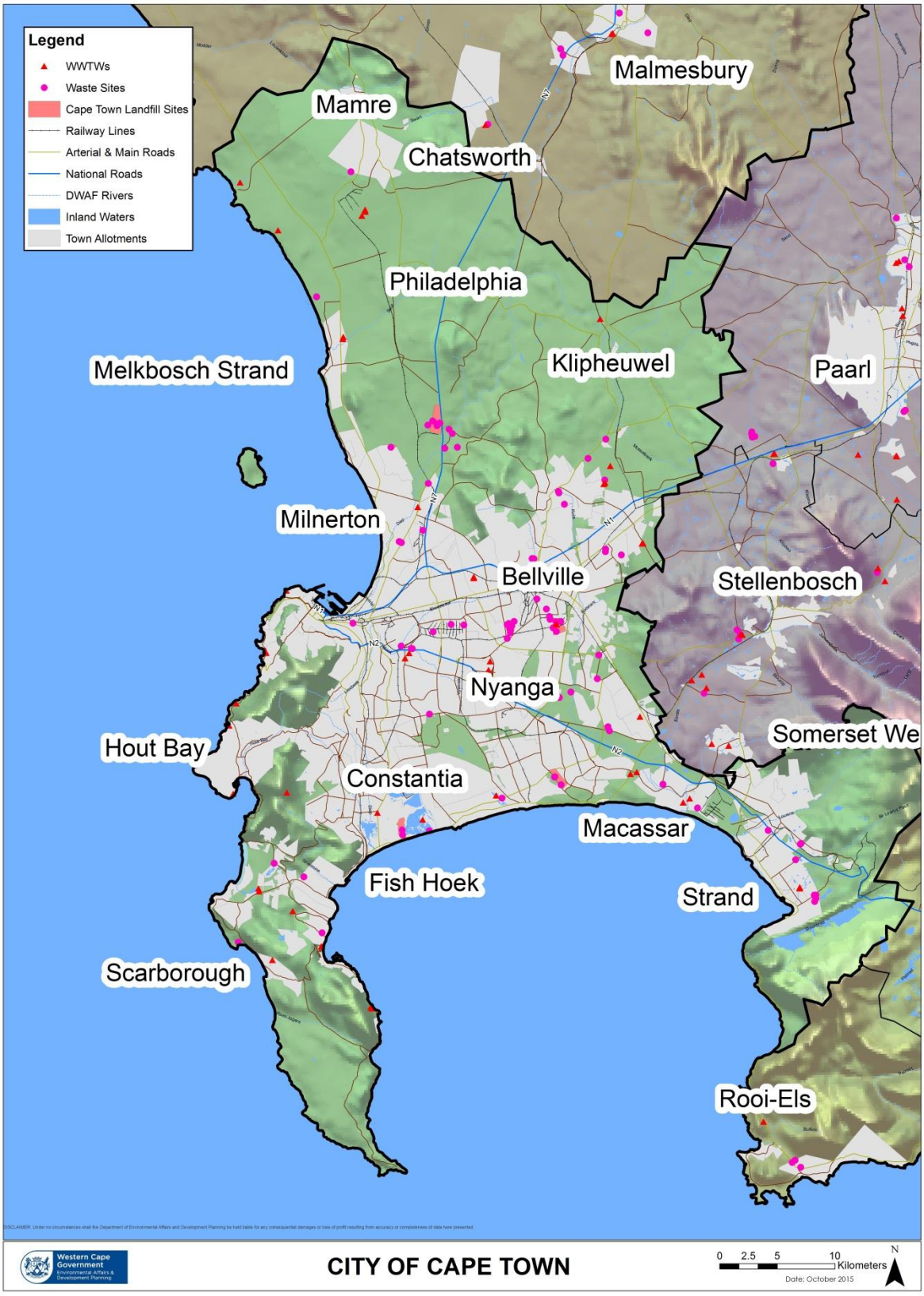


Figure 86: Geographical area of the City of Cape Town Metropolitan Municipality

4.9.1 Geographical Area

The City of Cape Town Metropolitan Municipality (CCT), a Category A municipality, is situated in the southern peninsula of the Western Cape province and covers an area of approximately 2,445 km^2. The CCT is neighboured by the West Coast District to the north, Cape Winelands District to the east and Overberg District to the south-east.

The CCT is the economic hub and capital of the province as well as the legislative capital of South Africa, where the national parliament and many government offices are located. It is famous for its harbour, as well as its natural setting in the Cape Floral Kingdom, including well-known landmarks such as Table Mountain and Cape Point. It is hailed as one of the most beautiful cities in the world and Africa's most popular tourist destination. Being the oldest city in South Africa, it is affectionately known as 'The Mother City'. The area has a warm summer mediterranean climate with mild, moderately wet winters and dry, warm summers. Winter may see large cold fronts entering for limited periods from the Atlantic Ocean with significant precipitation and strong north-westerly winds.

4.9.2 Demographics

This section provides the socio-economic characteristics of the population of the CCT based on statistical data and factors such as population, economic status, level of education, income levels and employment.

4.9.2.1 Current population and growth estimates

Table 63 depicts the population growth in the CCT and serves as an indication of demand for service delivery provision, which also includes integrated waste management services.

Table 63: Population growth (2001 – 2011)

Municipality	2001	2011	Average annual growth (%)
City of Cape Town	2,893,247	3,740,026	2.6

(Source: STATS SA)

The population has grown at a rate of 2.4% between 2001 and 2011. Population growth in the CCT implies an increase in waste generation between 2001 and 2011.

4.9.2.2 Household income levels

Figure 87 depicts the various income levels in the CCT for 2014.

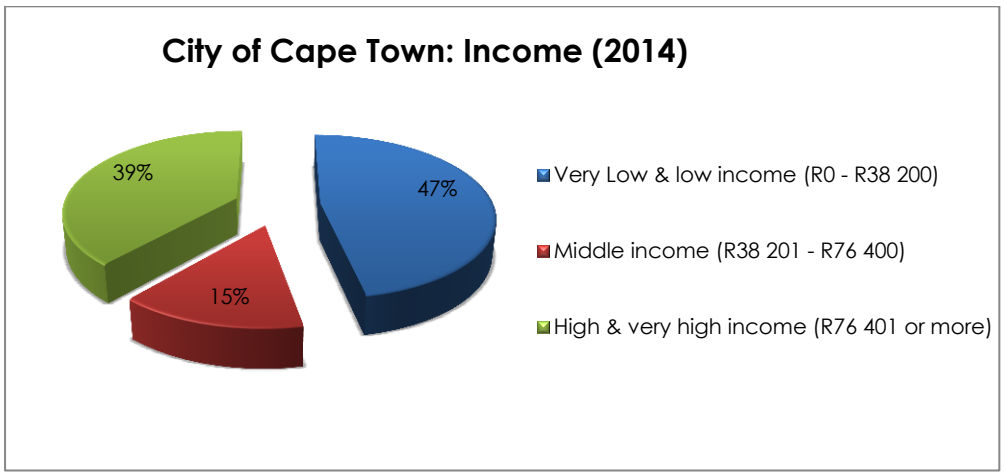

City of Cape Town: Income (2014)
39%
47%
15%
Very Low & low income (R0 - R38 200)
Middle income (R38 201 - R76 400)
High & very high income (R76 401 or more)

Figure 87: Household income levels, 2014 (Source: Provincial Treasury, 2014)

The majority of households (47%) fall within the very low and low income group (R0 – R38 200). A substantial amount of households (39%) fall within the middle income group (R38 201 – R76 400) with only 15% within the high and very high inome group (R76 401 or more)

4.9.2.3 Employment[54]

Figure 88 depicts the distribution of skills in the CCT for 2013. The employment status of the CCT indicates that the majority of employed people fall within the skilled formal employment category (431 105) and less than half of this number, 172 233 people, fall within the highly skilled formal employment category. The disparity between demand and supply for labour skills is indicated in the MERO studies and the MERO (2014) specifically highlights the oversupply of the semi- and unskilled employment category. However, in the CCT the demand for labour skills appears to be similar among all the employment categories except for the highly skilled employment category.

[54] Highly skilled occupations include managers, professionals and technicians, semi-and unskilled labour include domestic workers and other elementary workers *and skilled all other occupations, e.g. clerks, sales & services, skilled agricultural workers, crafts, machine operators, etc.* (StatsSA Labour Force Survey, LFS and QLFS).

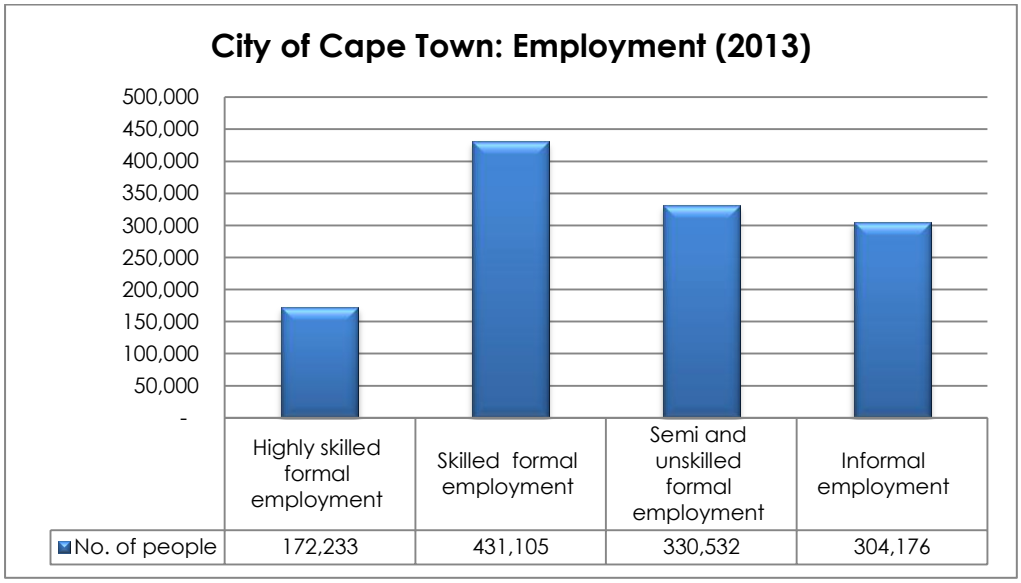


Figure 88: Employment, 2013 (Source: MERO, 2014)

4.9.2.4 Level of education

The level of education is considered as an indicator of the potential for employability, although this will be influenced by employment opportunities available within the CCT based on growth and development potential in the area. The Regional Development Profile documents (WCG: Provincial Treasury, 2012) emphasise the importance of education in improving access to employment opportunities and in sustaining as well as accelerating economic growth. Figure 89 depicts the level of education in the CCT for the years 2001 and 2011.

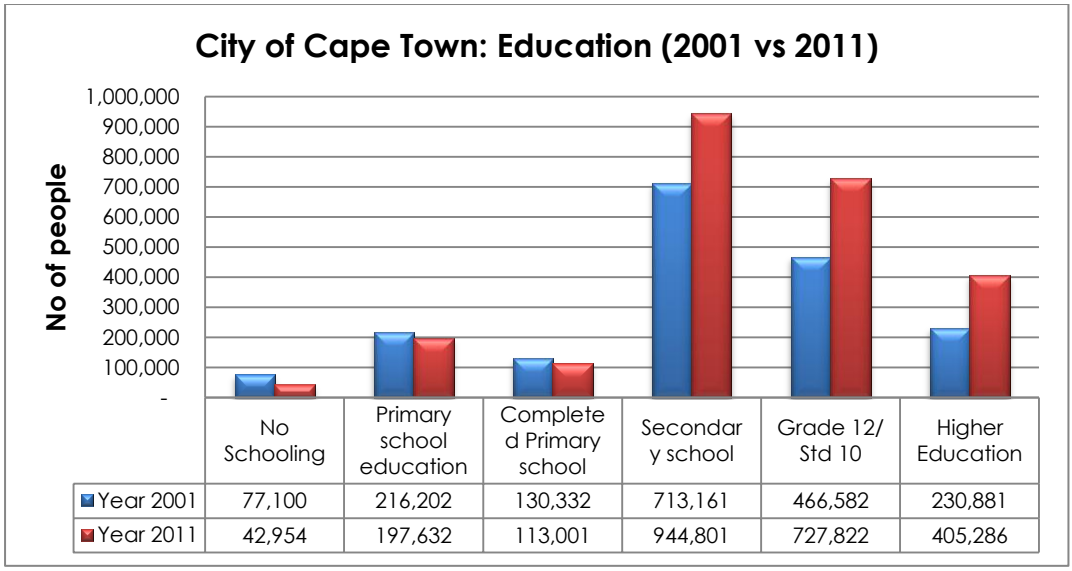


Figure 89: Education (2001 vs 2011)

The greatest number of people have received secondary schooling and passed matric/Grade 12 and this has increased from 2001 to 2011. There has been a notable increase in individuals receiving higher education between 2001 and 2011.

4.9.2.5 Economic status

Figure 90 provides the real economic growth rate (percentage real GDPR growth) of the main sectors for the CCT. The tertiary sector dominates in the municipality contributing to 78% if the GDPR. Dominant sectors are Business Servies (23.7%), Wholesale & Retail Trade (14.2%), and Finance & Insurance (12.1%). This gives an indication of the types of waste being generated in Cape Town.

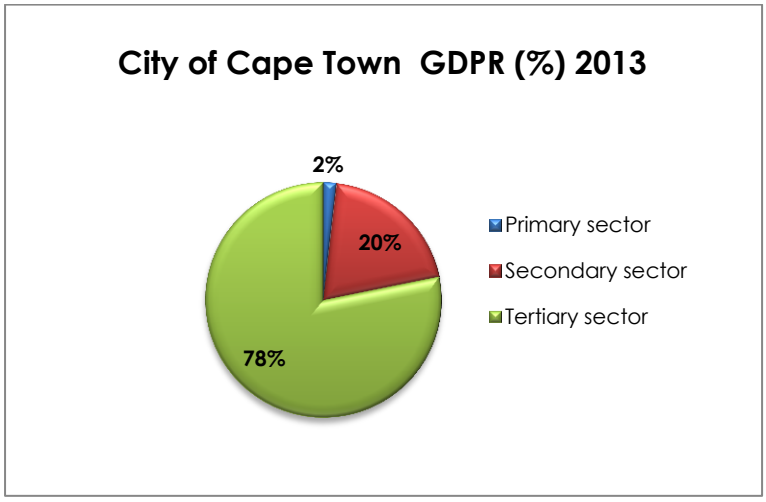


Figure 90: Sectors contributing to GDPR (MERO, 2014)

The detailed sector contributions to the CCT GDPR are shown below.

Primary Sector	Agriculture, Forestry & Fishing (1.5%); Mining,& Quarrying(0.1%); Water (0.2%)
Secondary Sector	Food, Beverages & Tobacco (2.5%); Textiles, Clothing & Leather Goods(1.3%); Wood, Paper, Publishing & Printing(1.8%); Petroleum Products, Chemicals, Rubber &Plastic (4.3%); Other Non-Metal Mineral Products(0.4%); Metals, Metal Products, Machinery & Equipment (2.3%); Electrical Machinery & Apparatus (0.4%); Radio, TV, Instruments, Watches & Clocks (0.3%); Furniture, other Manufacturing (1.5%); Electricity (1.3%); Construction (3.9%)
Tertiary Sector	Transport Equipment (1.2%), Wholesale & Retail Trade(14.2%); Catering and Accommodation Services (1.2%); Transport & Storage (5.3%); Communication (5.6%); Finance & Insurance (12.1%); Business Services (23.7%); Community, Social & Personal Services (5.0%), General Government (9.9%)

4.9.2.6 Transport Infrastructure

Cape Town is connected with three national roads viz. the N7 (Cape to Namibia) to the north, N1 connecting with Johannesburg and N2 connecting with Durban. A few railway networks for both commuters and goods services service the City. Refer to Figure 86.

A dedicated railway line transports solid waste from Athlone Refuse Transfer Station to the Vissershok regional WDF.

4.9.2.7 Development profiles

Residential, commercial and industrial developments have an impact on the amount and types of waste generated as well as the different kinds of waste management services required within a municipal area. In order to facilitate integrated waste management planning, municipalities need to have a good understanding of the developmental and infrastructural needs within the municipal area. This together with the demographics of the municipal area is required for projecting current and future waste quantities. This section provides information on housing backlogs and delivery programmes for the CCT and has been sourced from the 2014/15 IDP Reviews as well as housing demand and delivery information sourced from the Western Cape Government: Department of Human Settlements.

4.9.2.7.1 Housing type

The inhabitants of the CCT reside in a variety of housing types or dwellings.

Statistics South Africa (Census 2011) defines the three main dwelling types as follows:

- Formal dwellings include a house or brick/concrete structure on a separate stand or yard or on a farm, flat or apartment in a block of flats, cluster house in a complex, townhouse (semi-detached house in a complex), semi-detached house, house/ flat/ room in a backyard and a room/ flatlet on a property or a larger dwelling/ servants' quarters/ granny flat;
- Informal dwellings include a backyard shack, a shack not in a backyard but in an informal/ squatter settlement (informal residential) or on a farm; and
- Traditional dwellings include huts and structures made of traditional materials such clay, mud, reeds or other locally available natural materials e.g. homesteads/ rondavels.

Figure 91depicts the dwelling type and indicates the quality of housing in relation to human settlements. Figure 74 reveals that the majority of households in the CCT are in formal dwellings (79%) and 21% in informal and traditional dwellings.

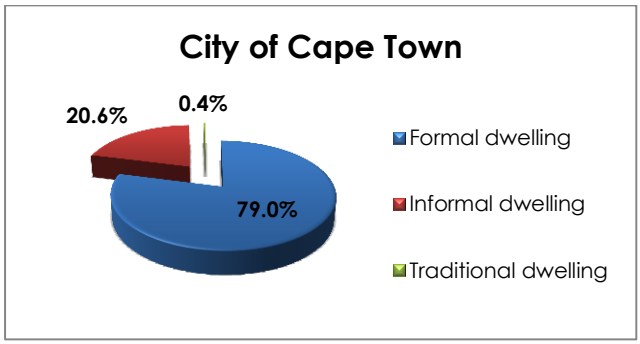


Figure 91: Access to housing (Source: STATS SA)

4.9.2.7.2 Housing demand and delivery

The Western Cape Department of Human Settlements (Raynita Robertson perscomm, 2015) highlights that Housing Demand databases within municipalities often include registered persons who may be residing within one District but have opted to register for a house in a different district. The housing delivery to date (2015) is at 2 786 houses and the remaining balance is 12 064. The current housing backlog and IDP housing projects are shown in Table 64

Table 64: Housing Backlog and IDP Projects (IDP Review, 2014/15)

Municipality	Housing Backlog	Housing projects	Budgeted/ Estimated Cost
City of Cape Town	350 000 households	No clear indication	No clear indication

The municipal IDP Review (2014/15) highlight the following regarding housing backlogs:

- The CCT together with WESCAPE (a CommuniTgrow project) partnered to develop approximately 200 000 houses over the next 10 to 15 years, of which 50% will be for households with a monthly income of less than R3 500,00.

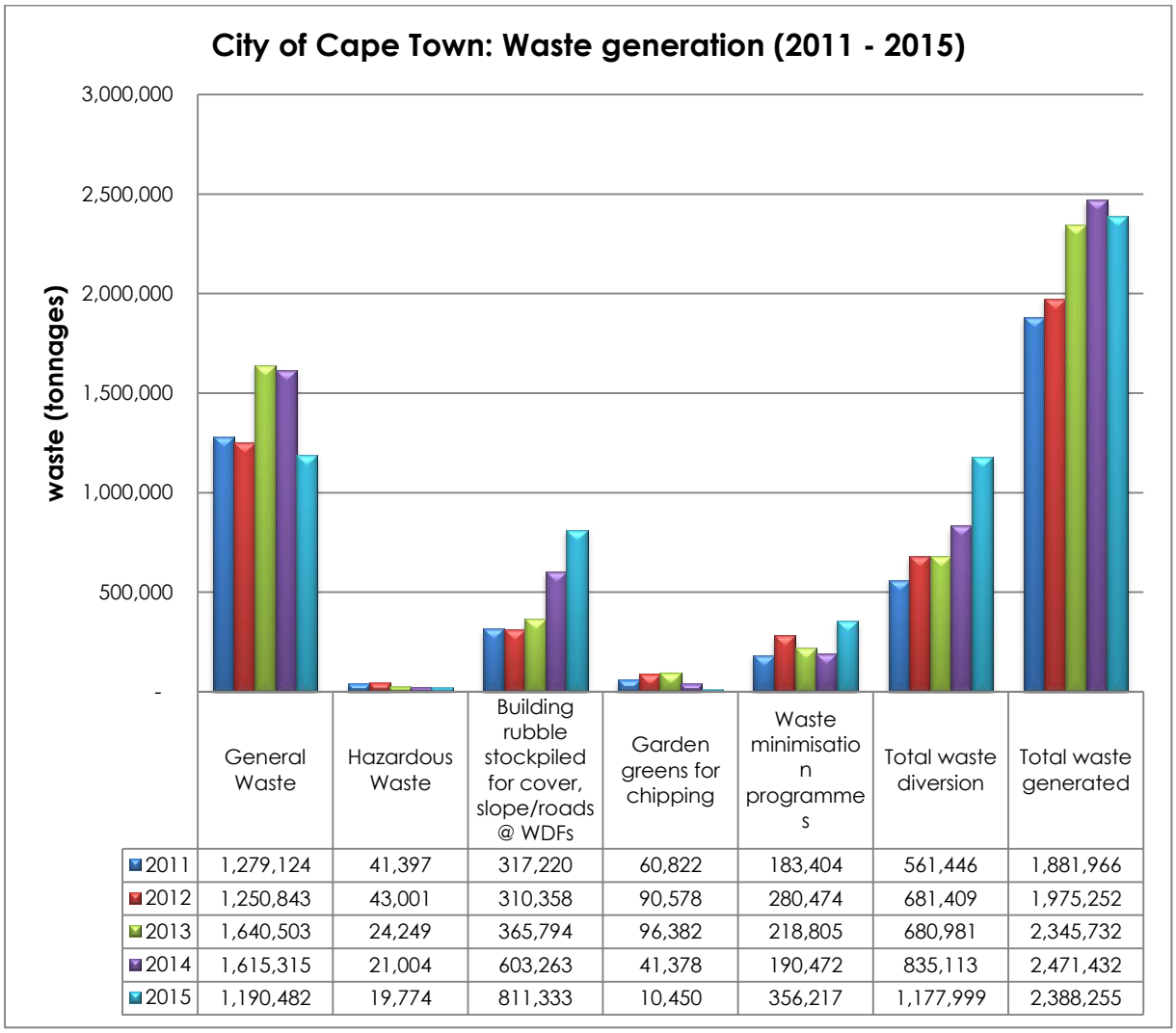
4.9.2.7.3 Housing delivery and Service levels

This section focuses on how the current and future housing status will affect the provision of the waste collection service. The CCT service levels data used in this section, basic services (100%) and free basic services (100%), was obtained from the Department of Local Government and provides the status of service levels as at June 2015. The data, however, does not provide specifics with respect to service provision to informal dwellings, particularly informal settlements. The municipality's plans may focus on improving the waste collection services as well as providing a service to houses that will be delivered as per the municipality's housing plans.

4.9.3 Waste generation areas

4.9.3.1 Waste generation

The total waste generated in the CCT increased steadily from 2011 to 2014 (i.e. 1 881 966 to 2 471432 tonnes). The total waste generated includes general waste, hazardous waste, building rubble, garden greens and waste minimisation programmes. The general and hazardous waste portion makes up the total waste disposed of at the WDFs. Building rubble and garden greens are diverted at WDFs and the remaining waste is diverted at other waste management facilities. In 2015 there was a large decrease in total general waste disposed of. This decrease co-incided with a large increase in total waste diversion. The reuse of building rubble and the recovery of recyclables via waste minimisation programmes mainly contributed to the total waste diversion increasing significantly in 2015.



	General Waste	Hazardous Waste	Building rubble stockpiled for cover, slope/roads @ WDFs	Garden greens for chipping	Waste minimisation programmes	Total waste diversion	Total waste generated
2011	1,279,124	41,397	317,220	60,822	183,404	561,446	1,881,966
2012	1,250,843	43,001	310,358	90,578	280,474	681,409	1,975,252
2013	1,640,503	24,249	365,794	96,382	218,805	680,981	2,345,732
2014	1,615,315	21,004	603,263	41,378	190,472	835,113	2,471,432
2015	1,190,482	19,774	811,333	10,450	356,217	1,177,999	2,388,255

Figure 92: Waste generation quantities 2011 – 2015

Note: 'Waste minimisation programmes' include chipping and composting of garden greens, re-use of building rubble, source separation, recyclables disposed of at drop off facilities (CCT 2015)

4.9.3.2 Waste composition

The results from the 2007 waste characterisation study revealed that paper and cardboard was the largest category available for recycling followed by organics, plastics and glass.

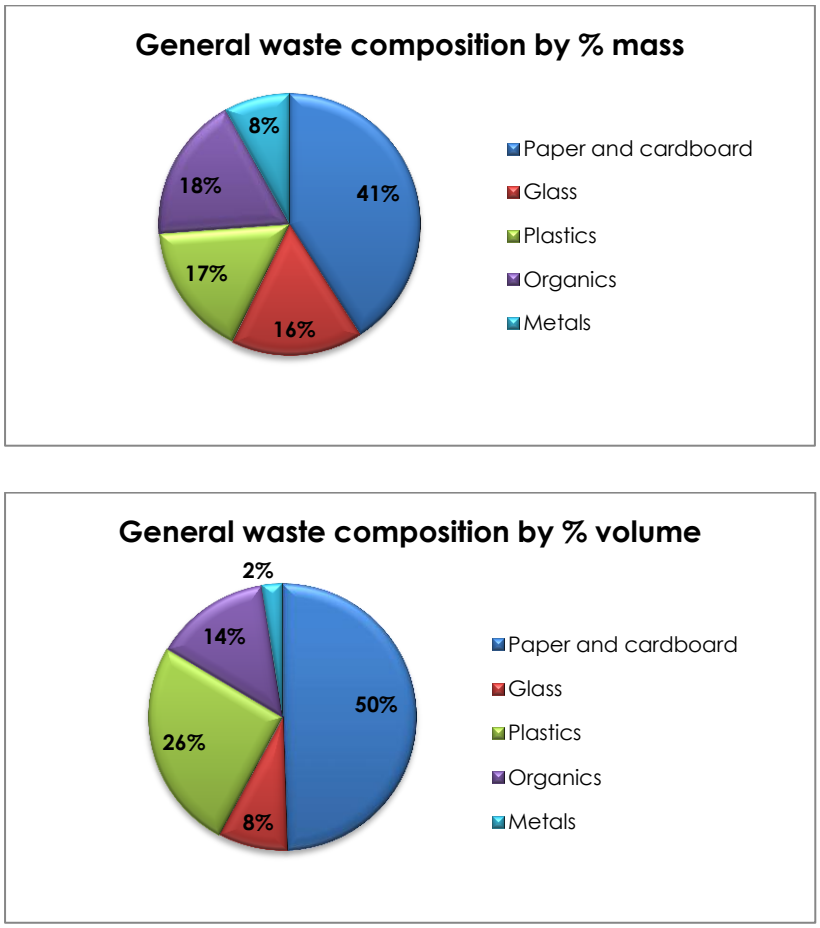


Figure 93: General waste composition by % mass and % volume

In addition, a waste characterisation study was conducted in 2011 by PDNA on the household waste stream only. The results from this study is shown in Table 65.

Table 65: Household waste fractions[55]

Waste fraction % (Household only)	February 2011 (PDNA)
Paper	15.50%
Glass	7.30%
Plastics - Containers	14.10%
Food Waste	8.10%
Greens/Garden Waste	15.20%
Metals	3.60%
White Goods	1.30%
Textiles	7.20%
E-waste	0.50%
Hazardous Waste	1.70%
Others	25.50%
Total	**100%**

Results from this study are significantly different as only the domestic waste composition was characterised. This will differ from the 2007 study as this study included general waste (domestic, business, industry) in the municipality

4.9.3.3 Health care risk waste

The Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007) defines Health Care Risk Waste (HCRW) as that portion of health care waste that is hazardous and includes infectious waste, pathological waste, sharp waste, pharmaceutical waste, genotoxic waste, chemical waste, waste with heavy metals, radioactive waste, and any other health care waste which is defined as hazardous in terms of the Waste Management Series: Document 1: Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, as published by the Department of Water Affairs and Forestry.

HCRW is either incinerated as a means of disposal or treated through Electro Thermal Destruction. Incineration of HCRW is one of the most effective means to eliminate the risks posed by health care risk waste and also reduces the overall volume of the waste. HCRW is mainly

[55] Solid Waste Management Integrated Waste Management Plan for the City of Cape Town (Incorporating - Sector Plan) (2013/14)

removed to be treated and disposed by service providers who have to be registered on the Western Cape Integrated Pollutant and Waste Information System (IPWIS) as required in terms of the National Environmental Management: Waste Act: National Waste Information Regulations, January 2013. The HCRW Generators are also required to register and report to the provincial IPWIS, which then exports the data onto the national waste information system (SAWIS).

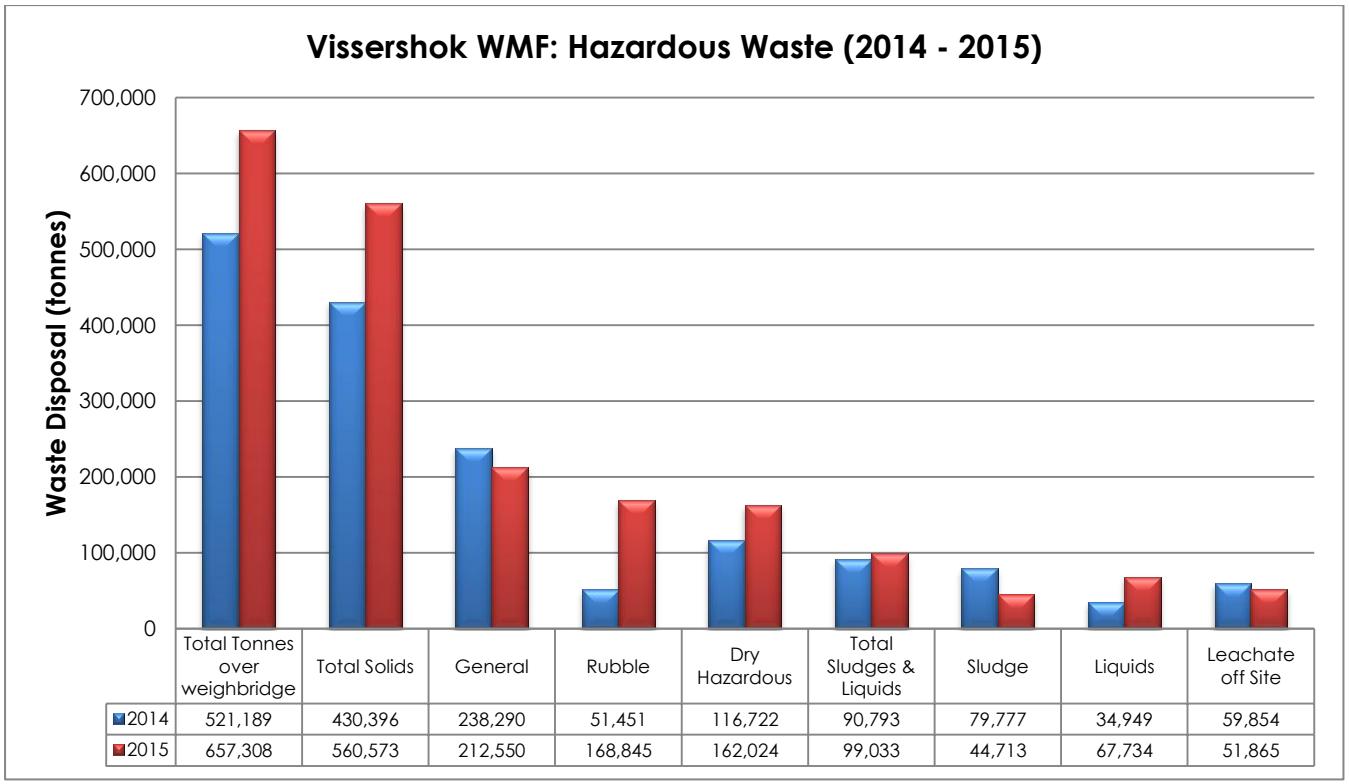
According to IPWIS (October 2015), 744 governmental, non-governmental and private healthcare facilities within the CCT have registered of which only 392 facilities are reporting on the provincial system to date.

4.9.3.4 Hazardous waste

The Vissershok WMF received a total of 1 178 497 tonnes of hazardous waste for the period January 2014 to December 2015. This amount consisted of the following:

- Total solids: The total solids are made up of general waste, rubble, dry hazardous waste and 30% of the total sludge received; and
- Total sludge/liquids: Total sludge/liquids are made up of liquids and 70% of the total sludge received.

The major contributors to the increase in the total hazardous waste received has been due to the increased amounts of rubble and liquid waste received.



	Total Tonnes over weighbridge	Total Solids	General	Rubble	Dry Hazardous	Total Sludges & Liquids	Sludge	Liquids	Leachate off Site
2014	521,189	430,396	238,290	51,451	116,722	90,793	79,777	34,949	59,854
2015	657,308	560,573	212,550	168,845	162,024	99,033	44,713	67,734	51,865

Figure 94: Hazardous waste: January 2014 – December 2015 (Visserhok Waste Management Facility)

4.9.3.5 Problem waste streams

4.9.3.5.1 Agricultural waste

According to the CCT IWMP (2013/14) agricultural land is generally serviced by the private sector as per the integrated waste management principles and standards of the CCTs Integrated Waste Management Policy. No information of waste types and quantities is provided in the IWMP.

4.9.3.5.2 Sewage sludge

As per the CCT IWMP (2013/14), the IWM Policy excludes waste originating from sanitation systems of whatever form, for which there are separate national and Council policies. It however makes provision for the disposal of treated sewage sludge of an acceptable quality that will minimise impact on the environment, as determined by separate guidelines from time-to-time.

Table 66 depicts sewage sludge management in the CCT.

Table 66: Wastewater Treatment Works and sewage sludge disposal

Wastewater Treatment Works	Sludge quantities	Disposal methods
Athlone	31.2 tonnes per day	Agricultural land application and transfer to another WWTW (Primary sludge is gravity thickened and then anaerobically digested on site and thereafter dried in sand drying lagoons. Sludge is stockpiled on site and removed during summer and applied to agricultural land. Secondary sludge is thickened by dissolved air floatation. Some of the sludge is anaerobically digested on site while the majority is discharged into the sewer feeding the Cape Flats WWTW for further handling on that site).
Bellville	10.4 tonnes per day	Agricultural land application (Waste activated sludge is mechanically dewatered on belt presses, deposited into skip bins and removed off-site for application to agricultural land. There is a small area on site available for emergency temporary storage).
Borcherds Quarry	10.5 tonnes per day	Landfill and land application (Primary sludge is mechanically dewatered and taken off-site for composting by a contractor. The secondary sludge is mechanically dewatered and taken off site for land application to agricultural land by a contractor. There is a temporary storage lagoon and sand drying beds for emergency use).

Wastewater Treatment Works	Sludge quantities	Disposal methods
Cape Flats	32.6 tonnes per day	Agricultural land application and landfill (Sludge is thickened, digested, dewatered and then dried into pellets. When certain units of the palletisation plant are not operational, the sludge may have to be pumped to drying lagoons or storage lagoons. At other times it may be possible to dewater the sludge, but not dry it then it will be taken off-site in a skip bin).
Fisantekraal	2.8 tonnes per day	Agricultural land application
Gordons Bay	1 tonne per day	Transfer to another WWTW (Secondary sludge is dewatered on sand drying beds. It is then taken off site for disposal by land application by contractor).
Hout Bay	No information received	No information received
Kraaifontein	3.2 tonnes per day	Agricultural land application. (The primary sludge and the humus sludge from the biological filters is cold-digested and then dewatered on a belt press. The wastewater activated sludge is dewatered separately on the belt press to prevent phosphate solubilisation. The dewatered sludge is removed by contractors, some of it is composted and the balance applied to agricultural land).
Klipheuwel	<0.1 tonnes per day	Septic tank cleaned and sludge removed to Kraaifontein WWTW.
Llandudno	<0.1 tonnes per day	Septic tank cleaned and sludge removed to larger works.
Macassar	10.4 tonnes per day	Agricultural land application (Secondary sludge is mechanically dewatered on belt presses and removed off site for disposal by application to agricultural land).
Melkbosstrand	0.9 tonnes per day	Agricultural land application (Secondary sludge is dried on sand drying beds and stockpiled on site. When necessary, sludge is removed and applied to land.)
Millers Point	<0.1 tonnes per day	Septic tank cleaned at intervals and sludge removed to a large works for disposal.
Mitchells Plain	8.5 tonnes per day	Agricultural land application (sludge is thickened, digested, dewatered and taken off site for land application on agricultural land).
Oudekraal	<0.01 tonnes per day	Septic tank cleaned at intervals and sludge removed to a large works for disposal.

Wastewater Treatment Works	Sludge quantities	Disposal methods
Philadelphia	Not applicable (Ponds)	Not applicable (Ponds)
Potsdam	14.7 tonnes per day	Landfill disposal and agricultural land application (raw primary sludge is mechanically dewatered and transported off site to be composted. Secondary sludge is dewatered and transported off site for land application to agricultural land).
Scottsdene	3 tonnes per day	Agricultural land application/ Secondary sludge is dried on drying beds and stockpiled. It is removed from site by Council Depots as and when required.
Simon's Town	0.4 tonnes per day	Cold digestion of primary and humus sludge. Sludge is then dried on sand drying beds. Dried sludge removed to Cape Flats works for disposal.
Wesfleur	2.5 tonnes per day	Land application (the secondary sludge is dried on sand beds and used off site for the cultivation of roll-on lawn by private persons).
Widevoelvlei	2.3 tonnes per day	Agricultural land application
Zandvliet	25.8 tonnes per day	Agricultural land application

4.9.3.5.3 Abattoir waste

There are no abattoirs in the CCT, however, Vissershok WDF accepts abattoir waste and for the periods January 2014 to December 2014 and January 2015 to December 2015 the facility has disposed of 41,7 tonnes and 9 tonnes respectively. There has been a major decline of abattoir waste between 2014 and 2015.

4.9.3.5.4 Tyres

The CCT IWMP (2013/14) notes that there is a lack of capacity to deal with tyre waste and often results in dumping practices with unnecessary cost and cleanup efforts by the municipality. This problem is expected to dissipate once mechanisms (i.e. collection) by the tyre industry have been implemented.

4.9.4 Waste avoidance, reduction and recycling

The CCT has a number of waste minimisation initiatives in place (CCT IWMP, 2013/14). These are directly taken from the IWMP and are discussed below.

- Phase 2 of the Home Composting Research Project in four selected project areas was initiated in February 2013. All participants have received home composting containers. Participants in this project includes 690 households, communal composting at 2 schools and one Non-Government Organisation (NGO).
- There are 24 drop-off facilities which the public can use for free to drop-off waste, including recyclable materials as well as green waste and construction rubble generated at households;
- A public-private partnership based on a pilot household recycling collection system under the name of "Yellow bag" was introduced pre - 2006 in Marina Da Gama. The project entails separation at source whereby co-mingled recyclable waste, which is placed in <40 micron plastic bags, is separately removed by the CCT;
- A number of alternative options for the collection and removal of the recyclables were piloted, including different vehicles, different density bags, and the co-removal in Rear End Loader compactor vehicles and transported to the Coastal Park landfill from where the yellow bags are recovered and collected by various private recycling companies;
- In 2007 the CCT introduced a further public-private partnership under the name "Think Twice" in the Atlantic Management Area, the Southern Suburbs as well as within the Helderberg basin. It is based on a pilot household recycling collection system for dry-recyclables (paper, tins and glass) using "clear" bags separately removed by an appointed contractor and taken to a MRF for sorting and baling;
- "Think Twice" was introduced during 2011 and 2012 in the Kraaifontein Integrated Waste Management Facility catchment area, but as a pilot only. All properties were issued with one 140 Litre wheelie bin mounted with a Radio Frequency Identification Device (RFID). Compactor vehicles were simultaneously equipped with electronic scanners and data transponders, to accurately record transactions.
- "Think Twice" was subsequently introduced within the high-density flat/complex & commercial areas of Sea Point, where "bulk" recyclables were removed by a Contractor and taken to a MRF for sorting and baling.
- A pilot Combined Bag Collection Study was conducted from August 2008 to November 2008 to investigate the feasibility of collecting and transporting bags with recyclables together with other waste in the same vehicle. Different compactor vehicles were tested (Packer Blade and Roto-press) with perforated bags and elastic bags of varying thickness and methodology to tie the bags. However, the outcome was negative;

- A waste minimisation project within municipal offices across the City was introduced in the first quarter of 2009. This project focusses on the collection and sale of waste paper and cardboard;
- Since February 2008, all building rubble collected has been crushed by private contractors and sold into the civil market. Building rubble constitutes a large fraction of the waste stream and, if it is free from contaminants, was accepted at the landfills at no cost.
- Garden waste is chipped at 13 facilities within the municipality (including drop-off and disposal facilities) and chipped green waste is composted at either the City-owned composting plant at the Bellville South Composting Facility or at private composting facilities around the city.
- The Integrated Waste Exchange (IWEX) project is a free online system that is available to business, individuals, institutions, schools, NGOs or community groups.
- The CCT developed and maintains a recycler's database to facilitate more aggressive marketing of anyone who is involved with providing either the public or businesses or both with a recycling or waste minimisation related services.

4.9.5 Treatment and disposal

The CCT IWMP (2013/14) states the following:

"The Council must ensure the provision, safe operation and availability of a variety of licensed waste disposal services, transfer, processing and disposal facilities, equipment and related infrastructure. This ranges from, but does not exclude alternative disposal infrastructure and technologies that may be needed to be introduced or established in future:

- special facilities for dropping off small volumes of recyclable materials by residents and some departments of the Council, including garden waste, which will be collected by recyclers;
- special processing and treatment plants, such as composting plants and builder's rubble crushing plants;
- special waste material recovery plants (e.g. MRF's);
- satellite waste transfer stations and waste transfer stations;
- landfill sites, which are licensed in accordance with the requirements of the National Water Act, and the Department of Water Affairs and Forestry guidelines."

Cape Town falls within a rainwater surplus region (in terms of the water balance between precipitation versus evaporation) which requires that special collection, treatment and disposal systems and management are implemented to prevent contamination of groundwater and other detrimental environmental impacts caused by leachate generation. The CCT has one leachate treatment plant located at the Vissershok (H:h) waste disposal facility, along the N7 towards Malmesbury. The Waste Disposal branch currently operates two licenced G:L:B+ general waste disposal facilities (Coastal Park and Bellville South) and one H:h selected hazardous waste disposal facility, Vissershok South.

As of 2012/2013 the available airspace measured at the Bellville South waste disposal facility were 3,359,471m^3, Coastal Park at 7,558,727m^3 and 2,911,257m^3 at Vissershok (H:h). Salvaging of recyclables is not allowed at these facilities. Bellville South WDF has received a license-variation and may remain open until 2018 limited to the same profile and footprint. This facility will be replaced by the Bellville Waste Management Facility which will start operations in early 2016.

According to the municipality's airspace model, Coastal Park is estimated to reach its full capacity between 2019 and 2022. Vissershok South, which is permitted to receive general municipal waste as well as low hazardous (H:h) waste, is estimated to reach full capacity anytime between 2014 and 2016. Vissershok South is the only municipal-owned waste disposal facility that has rail infrastructure to receive transfer waste by rail. Vissershok North is being developed and will become operational once the informal squatters on the land are relocated to Wolwerivier; this will take some pressure off the Vissershok South, thereby prolonging the operating life of the facility so as to continue to receive waste from rail.

The CCT also operates three refuse transfer stations at Athlone, Swartklip and the Kraaifontein refuse transfer station, which were commissioned in September 2010. Another refuse transfer station (Helderberg) is in the planning stages and the site for the proposed facility has received authority approval and operating permits.

4.9.5.1.1.1 Compliance and Enforcement

The CCT IWMP (2013/14) notes that the frequency of monitoring varies according to the status of the facility and/or the said permit requirements. The monitoring systems used by the Solid Waste Management Department are governed by the following legal requirements and other guidelines, namely:

- Section 20 (1) Operations or Operations-to-Closure Permits in terms of the Environment Conservation Act, 1989 (Act 73 of 1989);
- National Environmental Management: Waste Management Act, Act 58 of 2009 (NEMWA);
- Record of Decision in terms of Section 21, 22 and 26 as well as listed activity (No 8) in terms of the EIA regulations promulgated in terms of the Environment Conservation Act, 1989 (Act 73 of 1989);
- Amendments by DWAF to the Section 20 (1) Permit in terms of the Environmental Conservation Act, 1989 (Act 73 of 1989);
- Status Quo Reporting in the quarterly external audit by Naude Associates;
- In-house standards;
- Special projects such as the Hg air disposal study requested by the Morningside;
- Residents Monitoring Committee;
- Other studies or guidelines may occur from time to time.

Waste management facilities operated by the CCT are monitored for the following:

- waste types, waste volumes/mass;
- groundwater quality and management (except for ARTS), groundwater trends, leachate quality and management, surface water quality and management;
- biogass monitoring, air analysis (where required);
- health of workers, reporting of incidents, annual figures to DWAF;
- continuation of first aid training and stock, continuation of fire register upkeep, stock and usage of personal protective clothing;
- management of contactor employing salvage workers (where required), other compliance requirements in the said permit and RoD, construction and engineering operations in the DWAF approved permit, monitoring of FFS audit compliances by the ROSE Foundation and other parameters when required.

Figure 95 depicts compliance scores at WMFs that were audited by the Department in the 2015/16 financial year. Key challenges experienced at the WMFs are lack of cover material, windblown litter and storm water management. Facilities which yielded amber ratings (65 – 84%) will receive priority for the 2016/17 financial year.

Compliance scores ratings:

Total	Status Indicator		Action
85 – 100 %	Green	X	Small changes needed
65 – 84 %	Amber		Improvements required
0 – 64 %	Red		Major improvements required

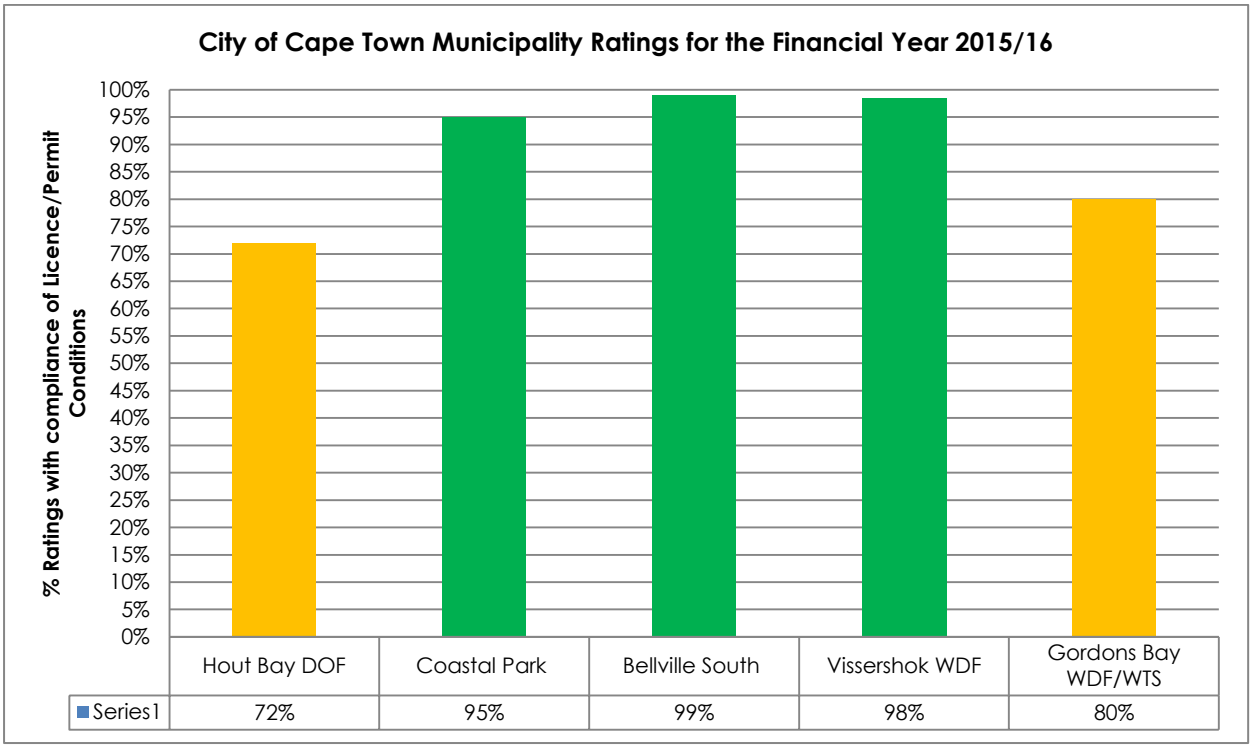


Figure 95: Compliance audit outcomes of Waste Management Facilities

4.9.5.1.1.2 Licences for operation, closure and decommissioning

The Disposal branch is responsible for the capping and rehabilitation of landfill cells as they reach their point of final closure. The closure of WDFs is undertaken according to regulatory requirements and maintained and monitored for a period of up to 50 years post-closure or when the facility becomes environmentally dormant. The CCT has commenced with the capping and rehabilitation of a number of closed landfill sites and completed cells at existing landfill sites. A programme is currently in place to systematically address the backlog of facilities that require capping and rehabilitation. Table 67 depicts waste disposal facilities which received closure and decommissioning licences between 2014 and 2015.

Table 67: Waste disposal facilities: closure and decommissioning

Town	Type of Facility	Licence Type	Code
Parow Industria	Waste Disposal Facility	Decommission	n/a
Brackenfell	Waste Disposal Facility	Closure	G:M:B+
Ocean View	Waste Disposal Facility	Decommissioning	n/a
Simonstown	Waste Disposal Facility	Decommissioning	n/a
Fish Hoek	Waste Disposal Facility	Decommissioning	n/a
Strandfontein	Waste Disposal Facility	Decommissioning	n/a
Macassar	Waste Disposal Facility	Decommissioning	n/a
Gordons Bay	Waste Disposal Facility	Closure	G:C:B+
Gordons Bay	Waste Disposal Facility	Decommissioning	n/a
Scarborough	Waste Disposal Facility	Decommissioning	n/a
Atlantis	Waste Disposal Facility	Decommissioning	n/a
Noordhoek	Waste Disposal Facility	Decommissioning	n/a
Kraaifontein	Waste Disposal Facility	Closure	G:C:B-
Khayelitsha	Waste Disposal Facility	Closure	G:L:B+
Table View	Waste Disposal Facility	Closure	G:C:B+
Faure	Waste Disposal Facility	Closure	G:L:B+
Kuils River	Waste Disposal Facility	Decommissioning	n/a

4.9.5.1.2 Regionalisation of waste management

The international guideline for airspace provision is considered to be a minimum of 15 years. It is noted that the CCT is well below this norm as 2 sites were proposed for the new regional disposal facility in 2000 in Kalbaskraal (176 – 178 hectare with avg. height of 50m AGL) and Atlantis (221 – 224 hectare with avg. height of 40m AGL). Delays are currently being experienced in the approval process for the planning and establishment of the new regional facility which will serve the CCT for another 30 years.

4.9.6 Current and upcoming alternative waste treatment options

In 2008 the City of Cape Town undertook a detailed technical feasibility study to identify opportunities for alternative waste management treatment options. This was part of the MSA Section 78 (1-4) study.

Findings from the study are as follows:

- Three potential landfill gas projects at three different locations (Visserhok, Bellville South, Coastal Park). These have been registered under the Clean Development Mechanism of the United Nations Framework Convention for Climate Change under the programme of activity, where the project boundaries are the national borders. This is an opportunity for other landfill projects across the country to also benefit from this registration;
- One wastewater sludge treatment project (Northern Works Biosolids Project). Two biomass, solid organic waste treatment such as anaerobic digestion, or a mechanical biological treatment facility;
- Three potential integrated waste management sites (IWM), with the recovery of high-value recyclables.

The next phase of the project would involve the appointment of a Transaction Advisor, whose main tasks would be to evaluate and structure these projects according to risks, costs and affordability to the municipality with the emphasis on delivering best value for money to the municipality.

The City of Cape Town has also received a donation from the Japanese International Co-operation Agency where a pyrolysis plant was installed at the Kraaifontein Integrated Waste Management Facility in 2015. The plant serves as a pilot project and enables the municipality to evaluate the viability of such waste-to-by-product projects within Cape Town. The current waste streams that will be used are plastics (polypropylene, polyethyleneand polystyrene) to produce diesel.

4.9.7 Waste collection services

Level of service in the CCT ranges from informal settlements, formal residence, non-residential and commercial. Residential services are provided by the Solid Waste Management Department or via Council tenders, which include community based contracts. The Council derives income by billing for services per its annually revised Tariff Schedule, unless a household is deemed "indigent". Indigence is based on a household's income threshold. Services to indigent households are deemed "free basic services", and are funded from government grants and cross-subsidised by a portion of the collected rates.

In the City of Cape Town residents and commercial businesses must have a contract with the Council unless otherwise determined, The Council currently has a prerogative regarding the choice of service mechanism and service provision in line with its obligation to assess an appropriate service mechanism per MSA, S.77, and to set tariffs as per the Tariff Policy for its waste management services

The following is a breakdown of the various level of service.

4.9.7.1 Informal Settlements

The standard level of service for residential waste collection, to informal settlements is aligned with the CCT Council's Indigent Policy. Informal households receives a weekly door-to-door waste collection service, according to a Council approved contract. Each informal household is provided weekly with bags, of a size, number and deisgn determined by the Council.

4.9.7.2 Formal Residences

The standard level of service for formal residences is a weekly, kerbside containerised waste collection service irrespective of who the service provider is. In this category, all dwellings per erf, including backyard dwellings, other than those where geographic or other service constraints make this impractical, will be provided with a plastic waste container, of a size and design to be determined by the Council.

The occupant must ensure that all residential waste that has been separated and cannot be recycled, is stored in the bin. The bin may only be placed outside the property boundary for weekly collection of the waste, on the day of the scheduled collection. Residential properties are defined as all improved properties, that are:

- Used predominantly for residential purposes, with no more than two dwelling units per property;
- Registered in terms of the Sectional Title Act;
- Owned by a share-block company;
- A rateable residence on property used for or related to educational purposes;
- And not subject to provisions of Section 4 of the rating of State Property Act. (CCT IWMP, 2013/14)

4.9.7.3 Commerce and Industry

Commercial waste collection services are partly provided either by the Solid Waste Management Department or private companies. The balance of commercial services is provided by the private sector. All commercial waste collection services must at least be provided according to the integrated waste management principles and standards of the City's Integrated Waste Management Policy. Industrial and health care entities must have a contract with a legitimate private sector service provider able to provide a service according to the nature of the waste that must be collected, and/or treated, and/or recycled, and/or disposed.

Specialised waste collection and related services and infrastructure for industrial and hazardous waste are part of "non-residential" services. These services are aimed at the industrial and the healthcare service sectors (including veterinary services) that generate hazardous waste of various categories, which requires special handling, transport and treatment before disposal.

4.9.7.4 Agricultural land

Agricultural land is defined as land primarily used for farming purposes and zoned as agricultural land and is generally serviced by the private sector according to the integrated waste management principles and standards of the City's Integrated Waste Management policy.

4.9.7.5 Area Cleaning Services provided or managed by the Council

The Council is responsible for ensuring general cleanliness in public spaces in its area of jurisdiction in terms of its Constitutional obligation for cleaning and cleansing in a municipal area. A "boundary-to-boundary" principle is followed to ensure that public places the Council is responsible for are maintained according to the policy. The Council provides services through both internal and externally-contracted mechanisms, which include community partnerships, to maintain cleanliness and hygiene standards.

Cleaning services consist of:

- The provision and servicing of street litter bins where necessary;
- Litter picking where required;
- Street sweeping;
- Street cleansing through the use of water tankers;
- Beach cleaning in accordance with the National Coastal Management Plan and the Council's Beach Cleaning Policy (2004);
- The clearing of illegal dumping;
- Animal carcass removal from public space.

4.9.7.6 Illegal dumping

The CCT has major challenges with illegal dumping. Hot spots are prevalent in Dunoon, Kensington, Khayelitsha, Nyanga, Browns farm (Philippi), Mitchells Plain and Philippi.

The Solid Waste Management and law enforcement staff do a regular monitoring of illegal dumping.

In 2012/2013 the CCT has spent about R 200 million for illegal dumped waste.

4.9.8 Cost of existing waste management

The CCTs operating budget is fully funded (58% from tariffs and 42% from property rates). Collection of waste from business and domestic clients, treatment and disposal of waste are fully funded from tariffs. Capital expenditure on bulk infrastructure i.e. RTSs and WDFs are partly funded from grants, and vehicles from CRR (Capital Replacement Reserve) and any shortfall will come from loans.

The price of treatment of one tonne of waste is R346.84 (excl. VAT) per tonne for general waste for both landfill and transfer station whilst hazardous waste is R507.04 per tonne (excl. VAT) for 2015/16

Collection of one tonne of waste, split between collection methods and waste streams, working backwards from R103.95 (excl. VAT) tariff per month for servicing a 240L container presumed to be averaging 16kg per lift (4.33 lifts per month) translates to R1.50 per kg or R1500 per tonne. While the cost is largely determined through a competititve process (tender) in respect of mixed domestic waste the cost is approximately R130 per tonne.

The costing structure is characterised by infrastructure requirements, depreciation on assets, interest on loans, provision for bad debt, overheads, corporate support charges etc. As the CCT employs incremental budgeting, these items are annually escalated to varying degrees based on provision in the tenders, consumer price index, established trends, collective agreement with organised labour etc., all of which go into a melting pot (MTREF model) to determine tariffs .The latter may be further influenced by additional requirements not provided for in the base i.e. additional staff in line with growth/need. Another factor the final tariff will be subject to, is the total impact from the basket of services (solid waste management, water and sanitation and electricity) on the end-user and may therefore require a need to cut costs to give effect to a fully funded budget.

Free services are funded out of the Indigent Account in respect to poor households and informal settlements as well as the Property Rates Account for free waste disposal of small loads at drop-offs).

Current challenges are the servicing of informal settlements and general cleansing services (beach cleaning, street sweeping, litter picking etc.), the operation of drop-off facilities and the internal support (finance, planning and human resources) are funded from the Property Rates Account.

Table 68: Operating Budget (2010/2011 – 2014/2015)

City of Cape Town - Solid Waste Management Operating Budget for 2010/2011 through to 2014/2015										
Expenditure Type	**2010/2011**		**2011/2012**		**2012/2013**		**2013/2014**		**2014/2015**	
	Plan	**Actual**	**Plan**	**Actual**	**Plan**	**Actual**	**Plan**	**Actual**	**Plan**	**Actual**
Employee-related costs	464 418 299.60	452 842 214.97	501 390 649.87	498 856 626.19	565 966 939.40	544 688 329.74	614 619 932.62	499 670 435.77	670 737 801.56	583 648 343.30
Contracted services	395 917 634.23	395 521 655.63	375 478 162.92	364 691 067.44	431 016 514.77	478 246 730.38	468 021 112.53	448 797 277.13	558 200 264.53	501 190 261.17
Repairs & maintenance	79 926 082.10	80 884 398.07	83 510 260.99	86 501 779.98	96 197 696.49	88 310 789.18	88 601 527.74	96 846 637.46	113 700 619.22	121 892 350.04
Depreciation	107 996 660.45	101 547 744.65	123 306 102.85	110 089 839.18	115 779 009.68	115 871 077.51	122 167 591.25	118 518 681.07	129 767 274.20	111 201 841.08
General expenses	232 553 028.89	191 919 458.34	275 897 064.31	204 175 434.67	224 091 551.44	286 409 863.85	225 946 731.49	244 404 975.09	210 061 616.59	220 918 170.90
Activity-based recoveries (office rental, printing, trunk radio utilisation etc.)	11 768 225.47	9 450 114.53	12 200 580.29	12 593 482.77	19 747 024.00	21 085 223.27	18 647 987.09	2 968 619.07	20 524 138.36-	17 227 458.60-
Support charges (Supply Chain, Legal Services, and Human Resources etc.)	166 063 103.84	152 620 916.95	186 075 549.87	169 800 190.09	226 341 564.27	218 171 484.03	232 182 658.83	201 585 973.76	233 444 171.40	214 570 294.48
Other (interest on loan, provision for bad debt, water/electricity consumption etc.)	379 057 766.46	424 204 533.40	423 631 401.31	430 134 989.84	483 573 122.66	514 559 959.64	475 145 468.42	520 424 396.91	591 851 892.96	657 565 766.61
Totals	**1 837 700 801.04**	**1 808 991 036.54**	**1 981 489 772.41**	**1 876 843 410.16**	**2 162 713 422.71**	**2 267 343 457.60**	**2 245 333 009.97**	**2 133 216 996.26**	**2 487 239 502.10**	**2 393 759 568.98**
Total expenditure as % of the Plan	**98.44%**		**94.72%**		**104.84%**		**95.01%**		**96.24%**	

Note:
The negative sign in line 10 denotes the value of the work (income) done by Facilities & Fixed Plant – the first time the Section did recoveries was in 2014/15.
General expenses in 2011/12 and the ongoing filling of vacancies (lengthy process) account for a dip in expenditure, though the 95% corporate target is met.

The Solid Waste Management Department spends between R200 million and R250 million on CAPEX and approximately R2.1 billion on OPEX annually (CCT 2013 as cited in Green-Cape 2016). Approximately 25 – 30% of its OPEX goes to service providers and/or contractors. These services are for waste collection, waste diversion, etc.). This illustrates that there is a possible R650 million available to industry when providing services to the CCT (Green-Cape 2016)

4.9.9 Governance

The Solid Waste Management Department of the Utility Services Directorate is responsible for waste management in the CCT. The municipality has adopted 'The Integrated Waste Management by-law' (March 2009). The by-law is aimed at regulating and controlling waste management within the CCT to ensure a uniform approach to waste management throughout the metropole.

4.9.9.1 Waste Management Officer

The CCT has identified a WMO in its Integrated Waste Management By-Law, 2009, as amended, in terms of the definition in section 1: "*Waste Management Officer" means the Director: Solid Waste Management or an officer referred to in section 25 of this By-Law.*" Section 25 of the By-law confers the following functions and powers on the waste management officer: "*Functions and powers of waste management office - The waste management officer shall be responsible for regulating, controlling, managing and enforcing the provisions of this By-Law and national and provincial legislation relating to waste management.*"

To confirm the above-mentioned, and to comply with Section 10(3) of the National Environmental Management: Waste Act, 2008 and the Integrated Waste Management By-Law, 2009, as amended, the City Manager appointed the Director: Solid Waste Management on 22 June 2012 as the municipality's Waste Management Officer, responsible for co-ordinating matters pertaining to waste management.

4.10Summary of Chapter 4

This Chapter provided an overview of the Department's mandate in terms of its supervision, monitoring and support function of local government and the current projects by the Waste Management Unit. It further gave an overview of current integrated waste management practices per district municipality in the Western Cape province.

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6 Signoff

I hereby approve the Second Generation Integrated Waste Management Plan: Status Quo Review

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NAME Date

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